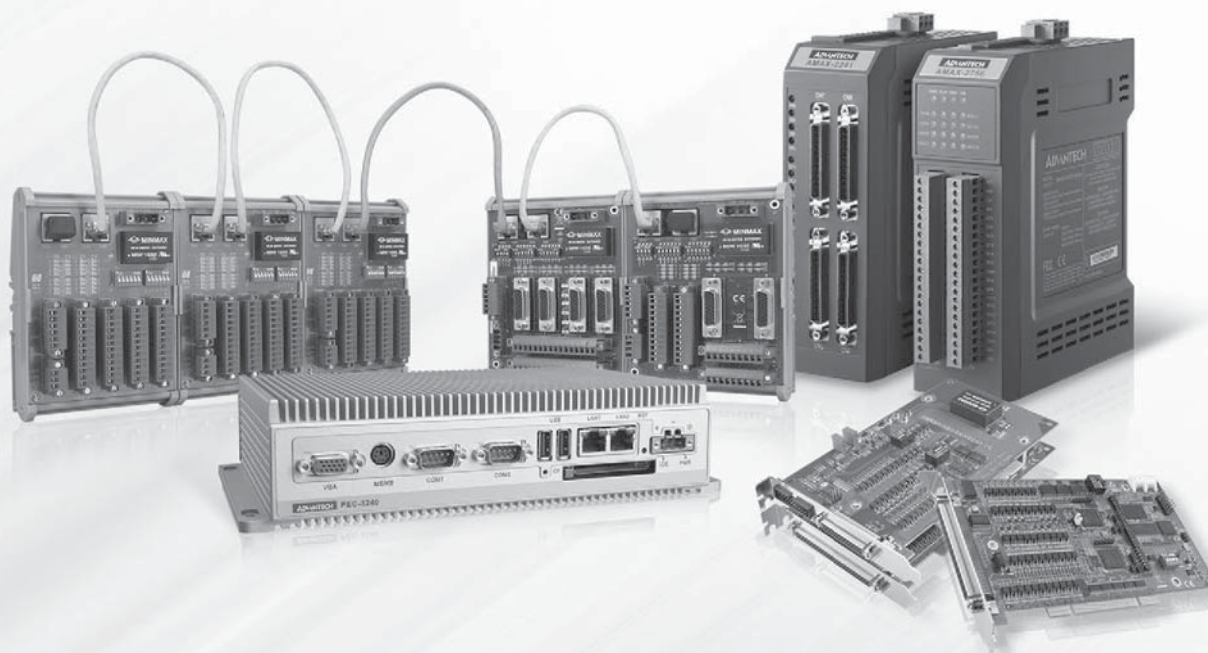


Motion Control

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To view all of Advantech's Motion Control Solutions, please visit www.advantech.com/products.

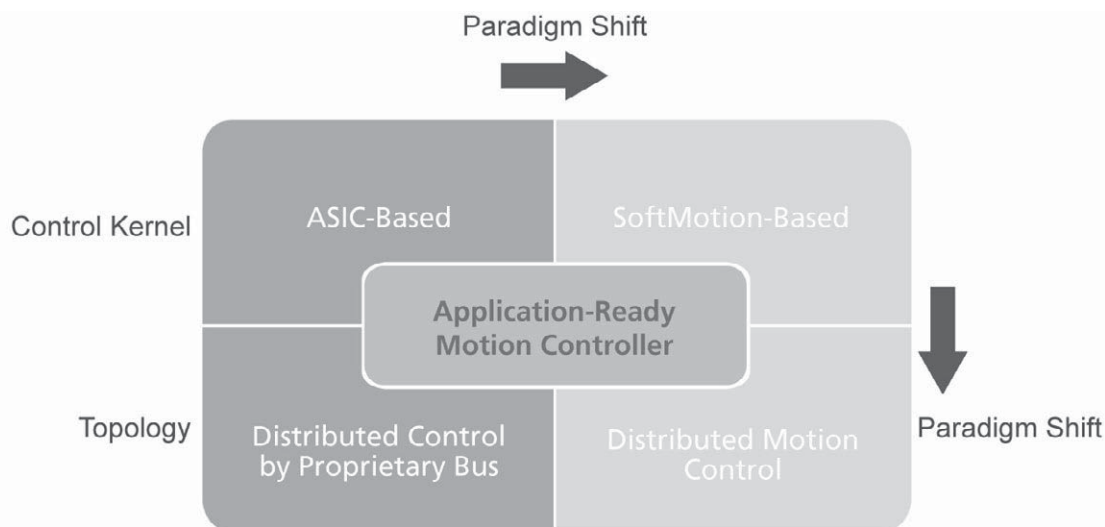


Motion Control Overview

Application-Oriented Motion Control Platforms to Fulfill a Variety of Control Requirements

Looking back over decades of PC-based motion control, ASIC-based & distributed control topologies through proprietary bus are quite common. However, the new emerging market for machine control comes with multiple-axis dependency, synchronization, and improved response times. These factors drive the paradigm shift from ASIC-based to SoftMotion-based and have more flexibility in design through suitable trajectories aligned with machines to meet the faster throughput, high performance and precision, and real-time Ethernet to give system integrators and machine builders help find the suitable solutions and reduce costs. Combining SoftMotion-based & Ethernet, this paradigm shift helps improve flexible trajectories, wiring-saving, and faster response times compared with past centralized topologies and reduce system implementation complexity.

Moreover, each quadrant of technology in the following diagram could be integrated into PC-based barebones to provide application-ready motion control platforms with off-the-shelf utilities and bountiful libraries for vertical market applications. For example, Advantech's PEC-3240 is a dispensing-oriented controller for the electronic industries.



Application-ready Motion Control Platform Related Technology Chart

ASIC-based Motion Control

Since the 1990's, Advantech has been developing several motion control boards with ASIC-based technology. Based on the ASIC kernel, the boards are digital signal type and connected with servo drives and motors to build a system. The pulse train speed and resolution will determine the control precision and response. Advantech's motion control team implemented application-ready libraries to fulfill the different machines in industry. The ASIC-based series boards are for GMC (General Motion Control) purposes to provide faster time-to-market with robust and cost-effective market adopters.

Distributed Motion Control

As industrial Ethernet technology moves forward to increase response times and accurate time-deterministic precision, using real-time Ethernet is the future trend and benefits many machine builders with open standards. Distributed motion control can significantly reduce wiring efforts and cost in significant ways. In the past, fieldbus control was proprietary and had lower response times. Machine builders only have limited options in the market. However, open standard real-time Ethernet is the next generation. This technology will be also applied to a variety of Advantech platforms to offer application-ready motion control platforms with real-time Ethernet technology.

SoftMotion-based Motion Control

In order to meet increasingly demands for complexity of trajectories, such as Gantry control & synchronization, and voltage signals for speed/torque control, Advantech's motion control team developed SoftMotion-based motion controllers and provides application-oriented & customization services. The SoftMotion technology is a control kernel executed by software which can run in DSP-based, RISC-based and X86-based CPUs with real-time extension. This technology gives flexibility in system implementation and the possibility to integrate third party real-time I/O control boards.

Features and Benefits of Common Motion APIs

Most machine builders and system integrators face library integration headaches from different vendors and different boards. Moreover, re-programming applications are necessary when the motion control boards are changed or upgraded. Advantech's motion control team delivered the common motion API concept and developed the common motion library to reduce time-consuming on this task and give faster time-to-market if any upgrading request exists. The common motion API concept is applied to all of Advantech's motion controllers.

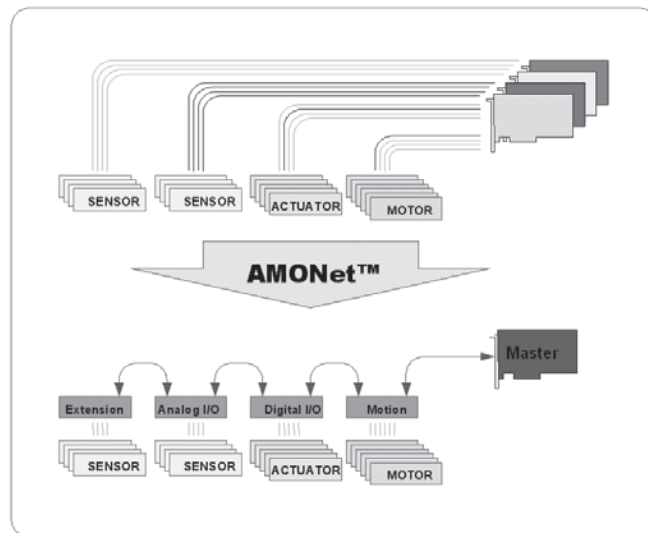
Application-Ready Motion Control Platform

In any vertical specific application, machine builders and system integrators are looking for application-ready control platforms. The main reasons for this consideration are system integrity and system stability. Compared with plug-in motion controllers plus industrial PCs, the application-ready motion control platform provides a well-designed system with validation to guarantee stability. Furthermore, this concept can bring higher add-on value to system integrators and machine builders.

Complete Application-Ready Platforms for General Motion Control Tasks

Advantech offers application-ready platforms that range from industrial workstations and industrial-grade CPUs, to motion control, encoder input and isolated I/O cards for general motion control (GMC) applications such as SMT/PCB, semiconductor and LCD manufacturing machinery. Advantech provides a full-range of industrial computing platforms that include high-brightness LCD displays, keypads, up to 20-slot backplanes and redundant power supplies for machine builders.

Nowadays general motion applications are divided into two functions - centralized and distributed motion control solutions. For centralized motion control, ASIC-based motion controllers are entry level that allow customers to easily build their own motion machines. As complicated and high performance applications are increasing, Advantech has recently developed SoftMotion control modules which are DSP-based to help customers do more tasks that ASIC-based motion modules can't do, such as gantry control, trajectory planning, electrical-CAM and so on. Furthermore, in order to enhance performance and stability, customized firmware in SoftMotion will be possible and can add secure protection for authorization. Advantech provides 2,4,6 and 8 axis motion modules to fulfill the different motion applications.



Wire-Saving/Long-Distance

AMONet - Advantech Distributed Motion Control Solutions

Motion control is growing in complexity as the number of axis in newly developed machines with motion control increases each year. Distance is also becoming an issue, as motors are located further and further away from the host computer. AMONet (Advantech Motion Network) was engineered to tackle the problems of increasing spending on wiring and maintenance of these complex motion control systems, and it also gets rid of distance limitations.

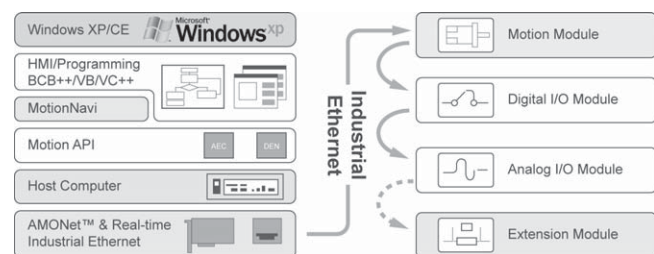
The first series of distributed motion control products from Advantech are called the AMONet RS-485 Series. AMONet RS-485 products are categorized as Master cards or Slave modules. While the Master card is kept in the host PC, the slave modules can be distributed so that they are next to motor drivers on the factory floor. The communication speed between the AMONet RS-485 slave modules can be up to 20 Mbps. This makes it possible to scan 2048 I/O points within 1.04 ms (or 1024 I/O points in 0.56 ms). Furthermore, an AMONet RS-485 master will update the I/O status automatically, and map data into local memory. Software running on the host PC can then read the status by simply reading the onboard memory, so no polling of slave modules is necessary.

Each port of a master card can control up to 2048 I/O connections or 256 motion axes, so future extensions are easily implemented. The distance between a master card and its slave modules can be up to 100 meters, and this distance is covered with a cost-effective Cat 5 network cable. In addition to saving wiring costs, debugging and maintenance are also simplified.

Another advantage of AMONet RS-485 is its compatibility with motor drivers from different vendors. Advantech provides specially designed wiring boards for popular motion drivers from vendors such as Panasonic, Mitsubishi, Yaskawa and Delta. This makes configuration easier, as pin-to-pin cables can be used. Having a selection of motor vendors can also be an advantage when sourcing of a certain motor is difficult.

Motion control and I/O functions with AMONet RS-485 use the same library. This unique feature saves time, as programmers do not need to study both a motion library and an I/O library. You can also connect to a manual pulse generator directly to adjust and calibrate the system without having to write programs first.

AMONet makes machine building with motion control easier. The savings made on wiring and programming effort, as well as the compatibility with a wide range of popular motors have already led to many requests for AMONet products.



System Architecture

1	WebAccess+ Solutions
2	Motion Control
3	Power & Energy Automation
4	Automation Software
5	Operator Panels
6	Automation Panel PCs
7	Industrial Panel Computers & Panel PC
8	Industrial Monitors
9	Industrial Wireless Solutions
10	Industrial Ethernet Solutions
11	Serial Device Servers and IP Gateways
12	Serial Communication Cards
13	Embedded Automation Computers
14	PACs
15	Compact PCI Systems
16	M2M I/O Modules
17	RS-485 I/O Modules
18	Ethernet I/O Modules

Motion Control Overview

A Broad Array of Products for Centralized Motion Control

Advantech's full product offering can accommodate all your motion control needs. You can choose from 2-axis and 4-axis controllers, ISA-bus-based or PCI-bus-based, and standard PC-based or embedded in a system. The functions of the motion cards also vary, from high-end linear/circular interpolation cards to low-cost point-to-point motion devices. And if you cannot find a controller to meet your exact requirements for an embedded motion controller, Advantech is ready to build cost-effective controllers to meet your criteria, whether it be adding digital I/O channels or changing connector styles, or perhaps changing CPU grade. With all the inherent costs, time and risks involved, there's no reason why you should design your own controller when you can instead rely on the expertise, cost-efficiency, experience and proven reliability of Advantech.

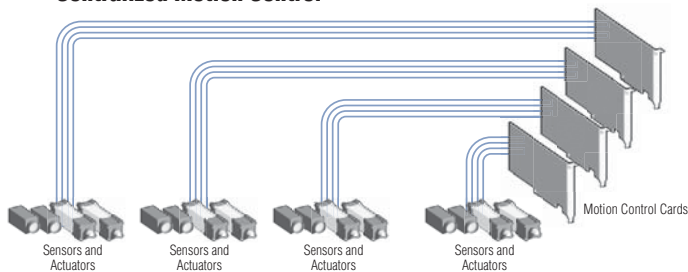
The Differences Between Centralized & Distributed Motion Control

Machine control system architectures generally fall into two categories - centralized or distributed. In a centralized system, all control loops including logic, trajectory generation, and PID control, are executed on a single processor. In a distributed system, the trajectory generation and logic control executes in the central processor, but the PID control loop is executed in the intelligent slave module. A distributed approach gives more processing power, while it reduces overall wiring cost and system complexity.

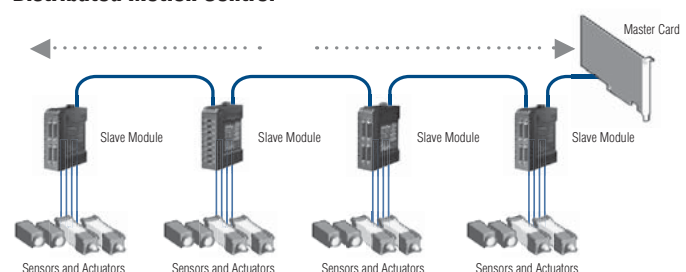
The Distributed Motion Control Products are categorized in two groups - Master Cards and Slave Modules. Communication between master and slave is based on a custom-engineered technology based on RS-485, which saves wires, transmits over long distances at high speeds, and has time-deterministic features.

The communication interface between master and host PC is based on memory mapping. Various functions can be chosen on the slave modules, and the industrial DIN-rail mountable design makes it easy to distribute them in the field. The master card collects information from slave modules and publishes the data to its host PC, and vice versa.

Centralized Motion Control

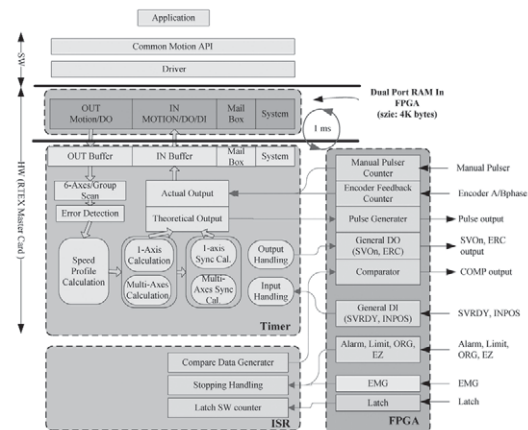


Distributed Motion Control



SoftMotion-based Motion Control

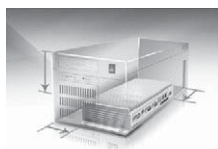
Advantech develops DSP-based SoftMotion control cards which enable the simplified utilization of complex motion manipulation involving JOG, PTP, linear and circular interpolation, multiple axes synchronized motion, and etc. For highly flexible programming features, it has the possibility to offer motion kernel customization. For high performance FPGA, high execution rate DSP, and Dual-Port RAM (DPM) technology, SoftMotion control cards can support faster encoding speeds, higher speed position comparison, and trigger pulse outputs over cards which use ASIC motion IC. SoftMotion controllers can provide programmable acceleration and deceleration to eliminate jerk and smooth velocity profile. For each axis, individual unlimited point tables can realize seamless continuous movements. These tables are also able to combine linear and arc segments. Based on the Common motion API—DSP & FPGA architectures, Advantech provides customers much easier programming environment and robust motion control.



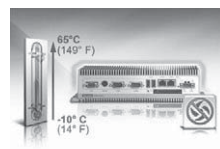
Application-Ready Motion Control Platforms - PEC Series

Advantech provides embedded motion control platforms for embedded motion applications. PEC series is 1/8 the size compared with standard industrial computers, even with built-in motion control and digital I/O. Analog input functionalities, greatly saving space and development time. Fanless, no internal cables, and diskless mechanisms allow PEC series to operate under -10 ~ 65°C (14 ~ 149°F) without any heat issues. Due to its PC-based computing architecture integrated with motion control and digital I/O, PEC series can handle a wide range of devices under test (DUT), such as touch panel profiles very quickly, greatly reducing development time. Its small size allows it to fit into space-constrained applications and its anti-vibration capabilities allow PEC series to withstand vibration and noise interference during verification processes. To meet different demands for industrial automation, PEC series provides a variety of motion control functions, such as 2/3-axis linear, 2-axis circular interpolation, continuous interpolation, T/S-curve speed profile and software limits. PEC series features USB ports, COM (RS-232) ports, 10/100 Base-T LAN ports, and CompactFlash slots. These interfaces provide the capability to easily expand peripheral devices and modules.

Compact Size



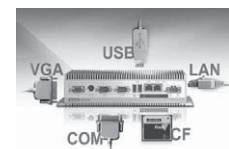
Robust Design



Advanced Motion Control



Multiple Interfaces



SoftMotion Introduction

Advantech's SoftMotion Introduction

SoftMotion is Advantech's important core technology in the equipment automation field. Compared to ASIC motion control solutions, Advantech's Machine Automation Team independently developed its own SoftMotion control technology and uses the FPGA (Field Programmable Gate Array) and DSP (Digital Signal Processing) as the core-computing hardware platform. Because of SoftMotion, which is developed into the software architecture, excludes the inherent limitations of ASIC specifications Advantech is able to offer the expertise of professional motion control for our customers and provides custom firmware to optimize customer's devices control as well as to minimize their needs for programming. Through SoftMotion technology enhancements, Advantech offers critical technologies in EMA (Electronic Machine Automation) and TMA (Traditional Machine Automation) fields. Meanwhile, based on the three motion control architectures (centralized, distributed and embedded), Advantech's comprehensive product offering helps our customers to continuously progress their technologies, so as to create a win-win opportunity.

Supporting Advantech's PCI-1245/1245E/1245L/1265/1285/1285E series, SoftMotion's features are described below:



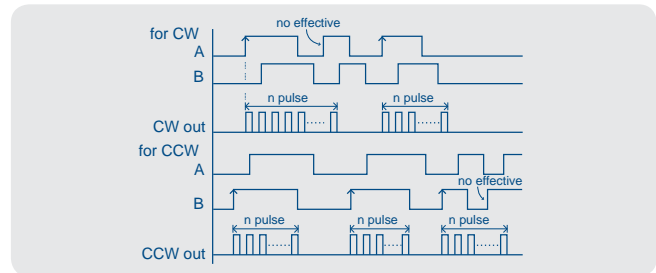
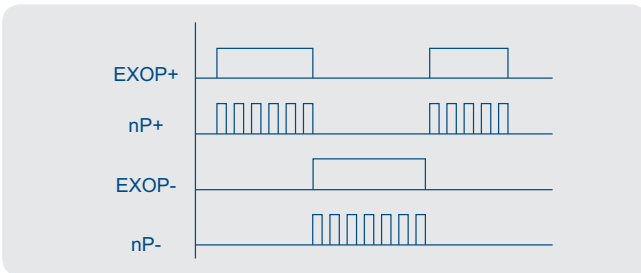
JOG Move

Manually control the axis to directly move within a fixed (predefined) amount of position or continuously in the +/- direction along all axes via external signals; with this feature, users can manually control the movement while reducing CPU loading without consuming system resource.



Handwheel Move

Use a handwheel to control a motor to rotate positively or negatively; also, users can define parameters for or use external handwheels to control axial movement.



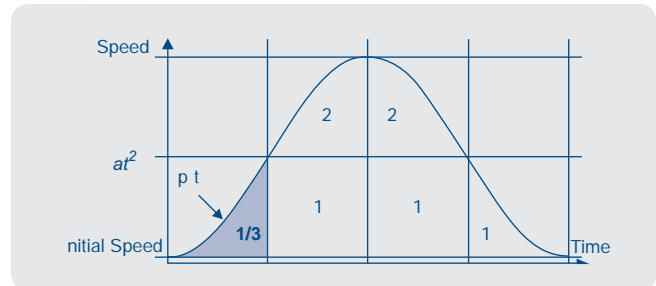
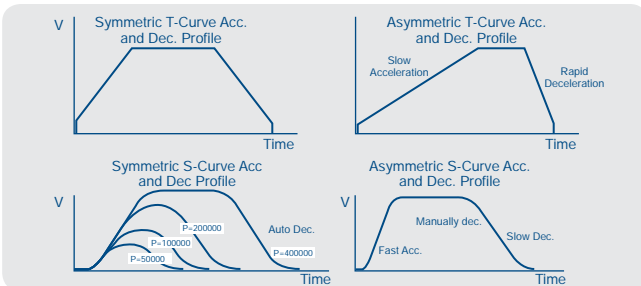
Trapezoidal & S-Curve Profile

Users can issue commands to configure movement profiles (initial speed, acceleration, deceleration, maximum speed and acceleration onset rate (or called jerk which is for S—speed—curve movement)) and control a motor to move based on predefined speed curves such as the trapezoidal curve or S-curve (second degree curve).



Programmable Acceleration and Deceleration

Programmable to define the rate of acceleration and deceleration and configure acceleration curve profile (the initial speed, maximum speed, acceleration, deceleration, Jerk) that best meets user needs. Acceleration and deceleration rates can be set independently to ensure the movement better & smooth!



Homing

SoftMotion supports more than 10 homing modes to fit into the mechanical design.

MODE1_Abs: Limited to using ORG only, movement (direction) → ORG trigger → stop

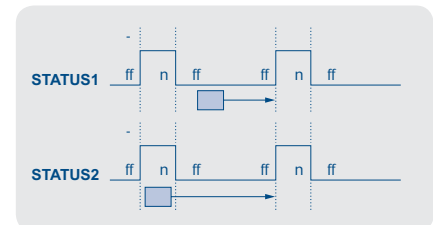
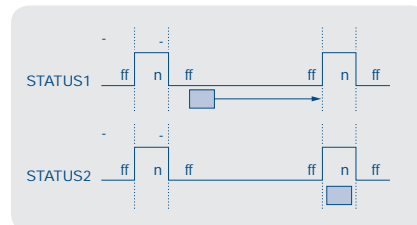
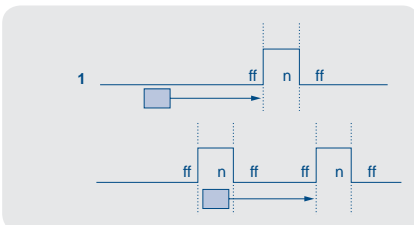
Example: Positive direction; ORG logic: trigger on a high voltage level

MODE2_Lmt: Limited to using EL only, movement (direction) → EL trigger → stop

Example: Positive direction; EL logic: trigger on high voltage level

MODE3_Ref: Limited to using EZ only, movement (direction) → EZ trigger → stop

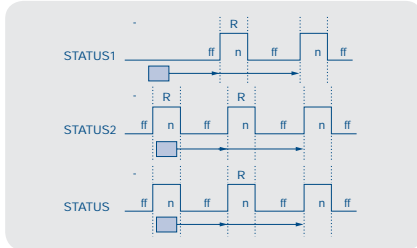
Example: Positive direction; EZ logic: trigger on high voltage level



SoftMotion Introduction

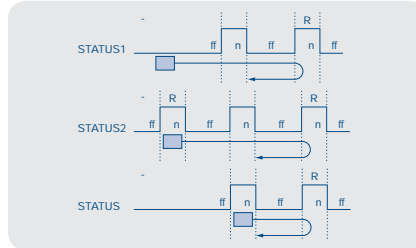
MODE4_Abs_Ref: ORG + EZ, movement (direction) → ORG trigger → stop → movement (direction) → EZ trigger → stop

Example: Positive direction; ORG logic: trigger on high voltage level; EZ logic: trigger on high voltage level



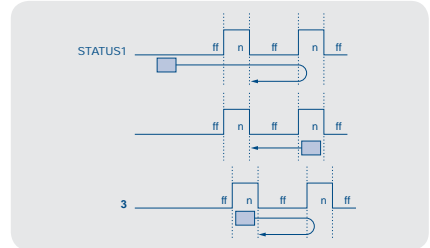
MODE5_Abs_NegRef: ORG + negative EZ, movement (direction) → ORG trigger → stop → movement (negative direction) → EZ trigger → stop

Example: Positive direction; ORG logic: trigger on high voltage level; EZ logic: trigger on high voltage level



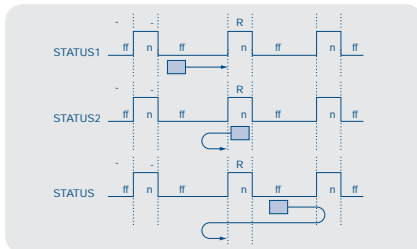
MODE6_Lmt_Ref: EL + negative EZ, movement (direction) → EL trigger → stop → movement (negative direction) → EZ trigger → stop

Example: Positive direction; EL logic: trigger on high voltage level; EZ logic: trigger on high voltage level



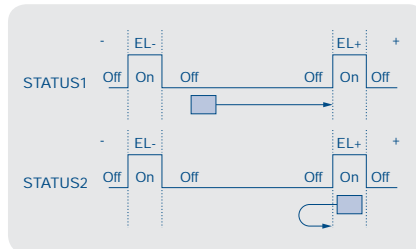
MODE7_AbsSearch: limited to searching ORG only, movement (direction) → ORG → stop

Example: Positive direction; EL logic: trigger on high voltage level
EL logic: trigger on high voltage level



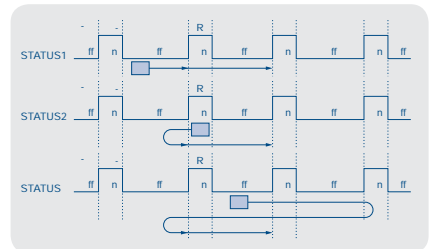
MODE8_LmtSearch: Limited to searching EL only, movement (direction) → EZ search → stop

Example: Positive direction; EL logic: trigger on high voltage level



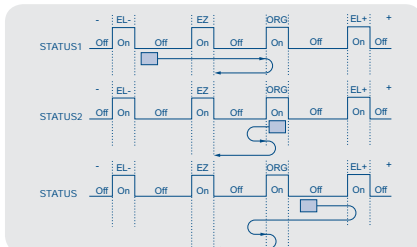
MODE9_AbsSearch_Ref: Search ORG+EZ only, movement (direction) → ORG search → stop movement (direction) → EZ trigger → stop

Example: Positive direction; ORG logic: trigger on high voltage level;
EL logic: trigger on high voltage level



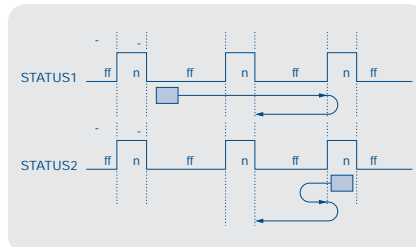
MODE10_AbsSearch_NegRef: Search ORG+ negative EZ, movement (direction) → ORG search → stop → movement (direction) → EZ trigger → stop

Example: Positive direction; ORG logic: trigger on high voltage level;
EL logic: trigger on high voltage level; EZ logic: trigger on high voltage level



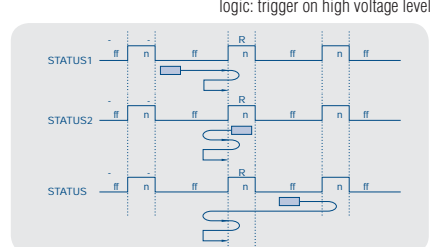
MODE11_LmtSearch_Ref: Search EL+ negative EZ, movement (direction) → EL search → stop → movement (negative direction) → EZ trigger → stop

Example: Positive direction; EL logic: trigger on high voltage level;
EZ logic: trigger on high voltage level



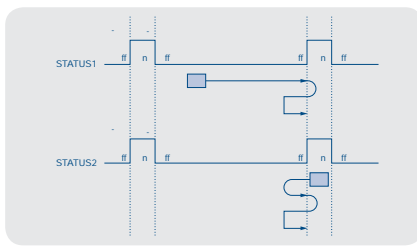
MODE12_AbsSearchRefind: Search ORG + Refind ORG, movement (direction) → ORG Search → stop → movement (negative direction) → Leave ORG(FL) → stop → movement (negative direction) → Refind ORG(FL) → stop

Example: Positive direction; ORG logic: trigger on high voltage level; limit logic: trigger on high voltage level



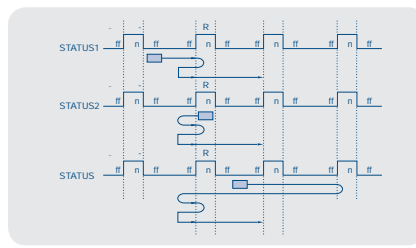
MODE13_LmtSearchRefind: Search EL + Refind EL, movement (direction) → EL Search → stop → movement (negative direction) → Leave EL(FL) → stop → movement (negative direction) → Refind EL(FL) → stop

Example: Positive direction; limit logic: trigger on high voltage level



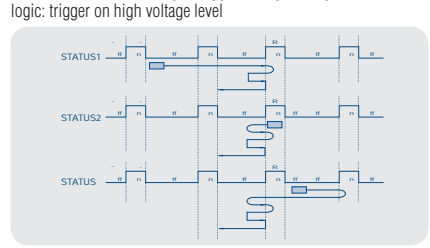
MODE14_AbsSearchRefind_Ref: Search ORG + Refind ORG + EZ, movement (direction) → ORG Search → stop → movement (negative direction) → Leave ORG(FL) → stop → movement (negative direction) → Refind ORG(FL) → stop → movement (direction) → EZ trigger → stop

Example: Positive direction; limit logic: trigger on high voltage level; ORG logic: trigger on high voltage level



MODE15_AbsSearchRefind_NegRef: Search ORG + Refind ORG + NegEZ, movement (direction) → ORG Search → stop → movement (negative direction) → Leave ORG(FL) → stop → movement (negative direction) → Refind ORG(FL) → stop → movement (Negative direction) → EZ trigger → stop

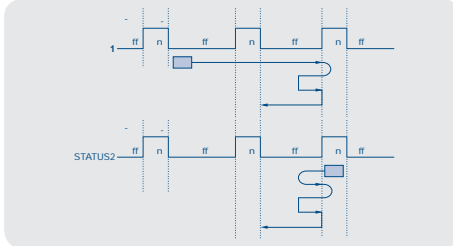
Example: Positive direction; limit logic: trigger on high voltage level; ORG logic: trigger on high voltage level



MODE16_LmtSearchRefind_Ref:

Search EL + Refind EL, movement (direction) → EL Search → stop → movement (negative direction) → Leave EL(FL) → stop → movement (negative direction) → Refind EL(FL) → stop → movement (negative direction) → EZ trigger → stop

Example: Positive direction; limit logic: trigger on high voltage level

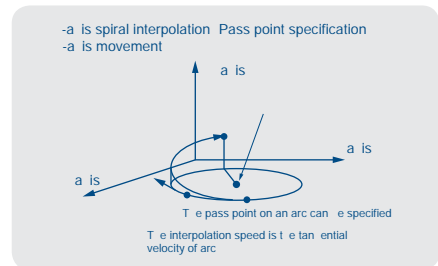
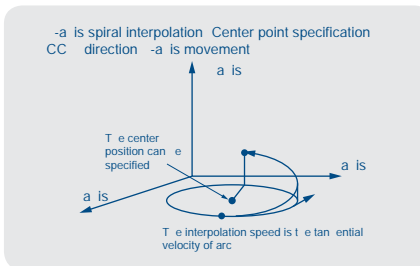
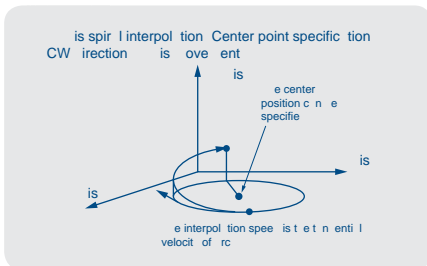


Helical / Spiral Interpolation

Helical / spiral movement by interpolation defined by

- (1) center position
- (2) terminal point on the circular route or points along the circular route
- (3) terminal point on the circular route and Z axis movement.

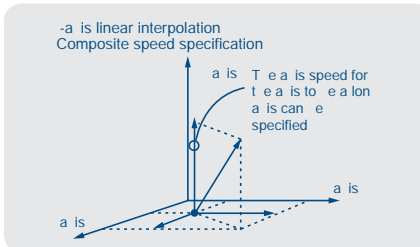
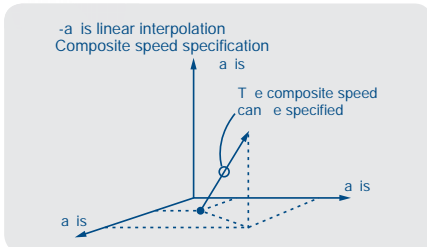
To perform interpolation up to 2+1 axes for helical / spiral movement.



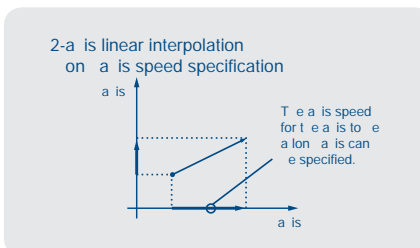
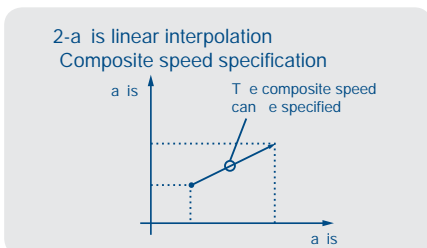
Multi-axis (Group) Motion

- Group settings: up to 3 group settings
- Linear interpolation: up to 8 axes
- Speed override is available

3-axis Linear Interpolation

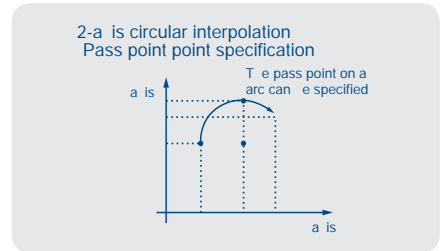
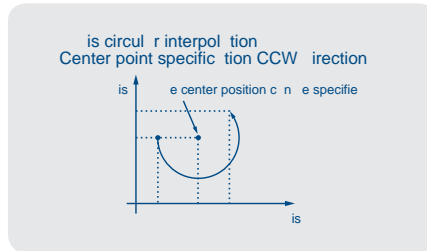
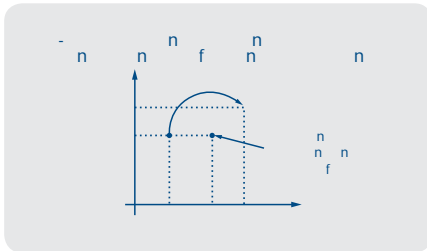


2-axis Linear Interpolation



SoftMotion Introduction

2-axis Circular Interpolation



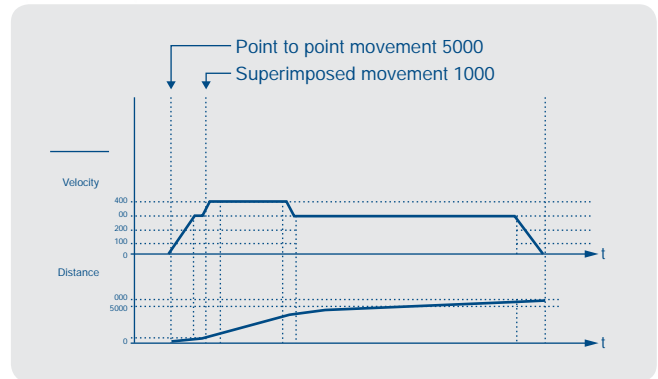
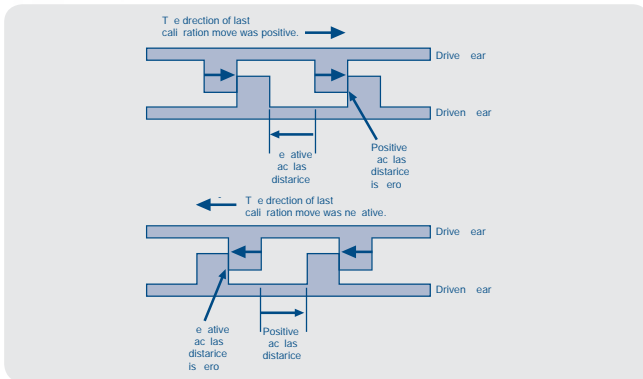
Backlash Compensation

In order to enhance ball screw repeatability precision, special algorithms and commands can be adopted to eliminate these errors and offset their inherited weakness in mechanism design.



Superimposed Move

Change the current state of motion by superimposing new commands onto existing movement. E.g. the expected position and speed are 5,000 and 300. The state of motion is changed by superimposing position 1,000 and speed 100.



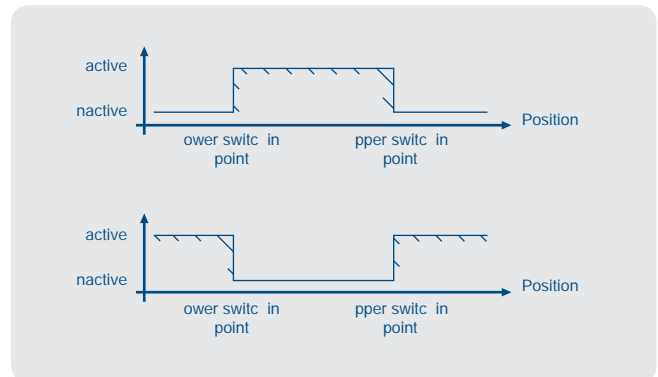
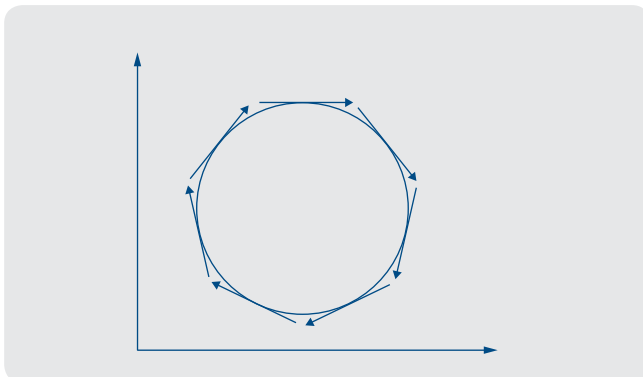
Tangential Following

The knife control of cutting machine is typical application. For Z axis movement, a motor follows the X-Y movement and curve. As shown below, the tangential direction of the circular movement for the Z axis on this X-Y dimension will be adjusted instantly to ensure that the radius between its movement and the circular trace stays at 90 degrees.



Position Window Output

The digital output voltage level within a certain position window can be controlled by using commands.

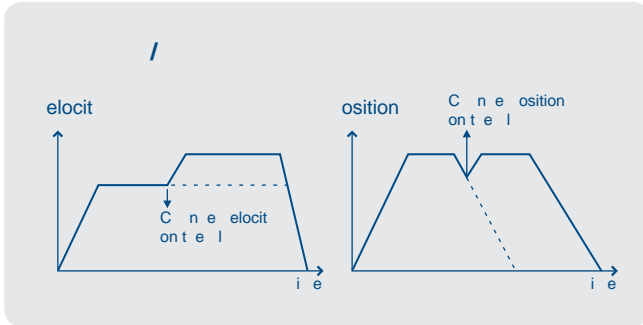


SoftMotion Introduction



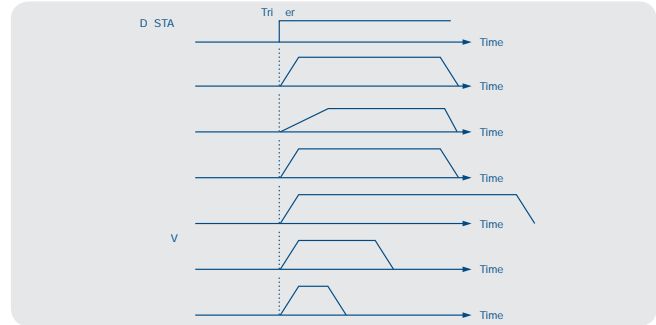
Position / Velocity Override

Under certain conditions, users can use commands to set up and change the position of a terminal point and movement speed to fulfill certain purposes. The terminal points and movement speed can still be changed on the fly.



Simultaneously Start/Stop

Simultaneously start/stop can be achieved by issuing commands to configure settings to trigger multiple axes and multiple cards from external signal sources. Software control via commands is also supported.



Trigger Function

- Single compare & trigger: trigger on a single position.
- Table compare & trigger: multi position triggers during fixed intervals or variable intervals can be achieved via commands.
- Linear compare & trigger: triggers on any position within 2D or 3D space can be achieved via commands.
- Compare and toggle trigger: as shown in the bottom right figure, we can set to invert DO after triggers of a certain position – ex. high voltage level at the first point after triggers for DO, low voltage level at the second point after triggers for DO, and high voltage level again at the third position and ends with a low voltage level at the fourth point.

Single Compare & Trigger

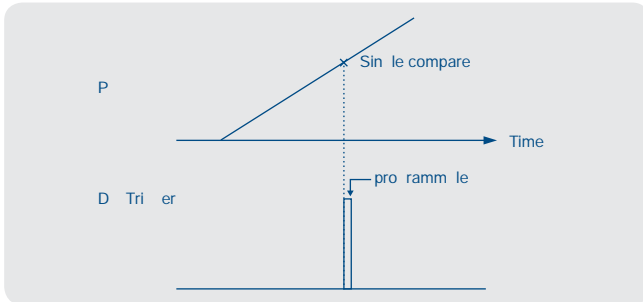
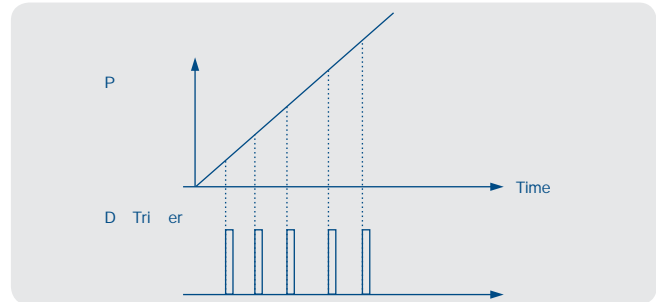
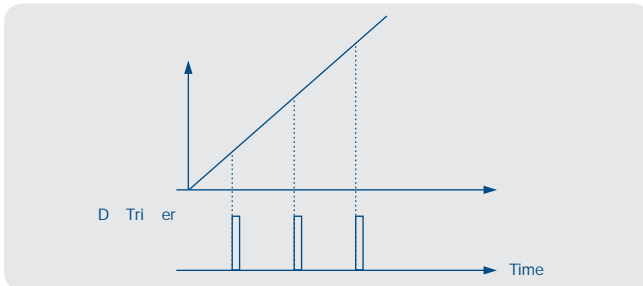


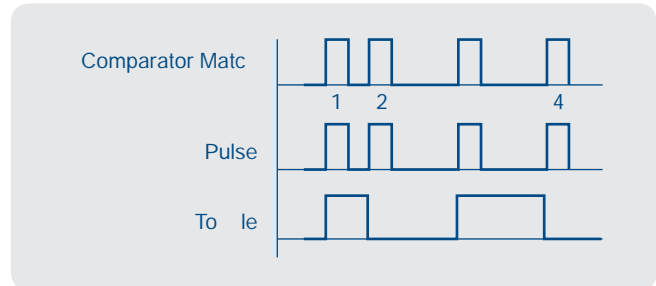
Table Compare & Trigger



Linear Compare & Trigger

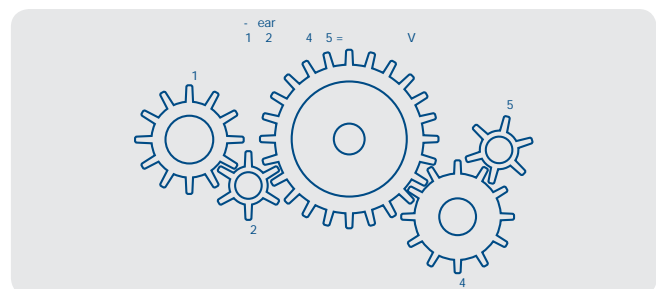


Compare and Toggle Trigger



E-Gear

Multi-axial and absolutely synchronized controls can be achieved through SoftMotion algorithms and parameter configurations. With E-Gear, users can enforce configurations and controls over master and slave gears through their relationship. This not only simplifies the mechanism designs, but also saves mechanism space and enforces absolute and synchronized controls.



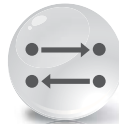
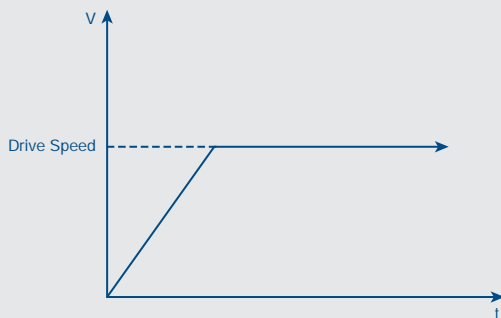
- 1 WebAccess+ Solutions
- 2 Motion Control
- 3 Power & Energy Automation
- 4 Automation Software
- 5 Operator Panels
- 6 Automation Panel PCs
- 7 Industrial Panel Computers & Panel PC
- 8 Industrial Monitors
- 9 Industrial Wireless Solutions
- 10 Industrial Ethernet Solutions
- 11 Serial Device Servers and IP Gateways
- 12 Serial Communication Cards
- 13 Embedded Automation Computers
- 14 PACs
- 15 Compact PCI Systems
- 16 M2M I/O Modules
- 17 RS-485 I/O Modules
- 18 Ethernet I/O Modules

SoftMotion Introduction



Velocity Motion

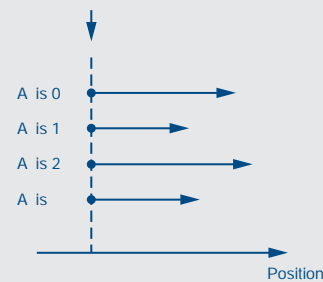
Via commands, users can control motors to operate continuously under a defined speed.



Multi-Axis Point to Point Motion

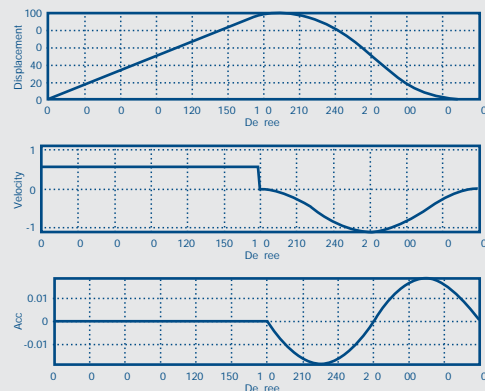
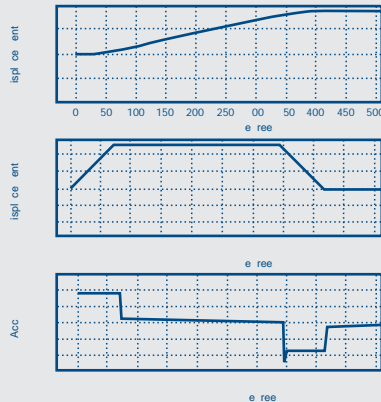
Entering terminal points of axis with relative and absolute positions, users can configure the motor to arrive at the final position configured. With this feature, users can activate multi-axial control and simultaneous start/stop on the same or different cards.

Simultaneous Start



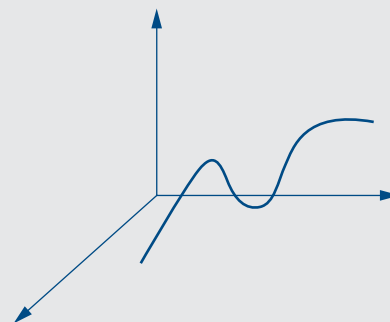
E-Cam

The relationship of relative movement between master (shaft axis) and slave (follower axis) axes can be established from following tables and it can simulate moves of the cam and provide multiple movement models based on the relationship.



Path Table Motion

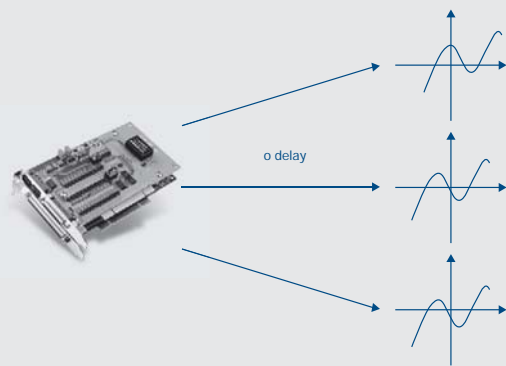
- Supports up to 3 describing path tables and each table can be up to 10,000 points
- Supports linear and circular interpolation commands
- Supports start/stop motion list as descriptive commands for movement control
- Supports Pause/ Resume commands
- Supports Auto Blending
- Supports Z axis following movement



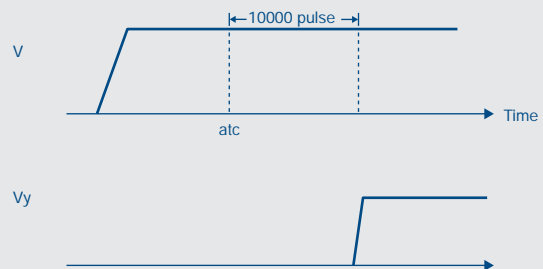
- 1 WebAccess+ Solutions
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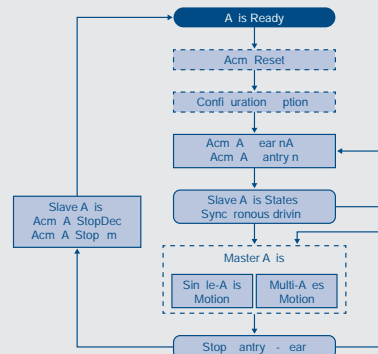
With SoftMotion algorithms designed to enhance DSP and FPGA interaction, users can use the system to perform interpolated movement: to simplify the design of machines for mechanism designers.



Record down the theoretical and actual motor positions when corresponding sensors are triggered.



A 3D schematic diagram of a 2-DOF piezoelectric actuator system. The system consists of two parallel piezoelectric actuators (labeled 1) that drive a central mechanism. This mechanism includes a central block with a curved arm and a vertical rod. A coordinate system is shown with a vertical axis and a horizontal axis. A double-headed arrow labeled 2 indicates the vertical displacement of the central block.

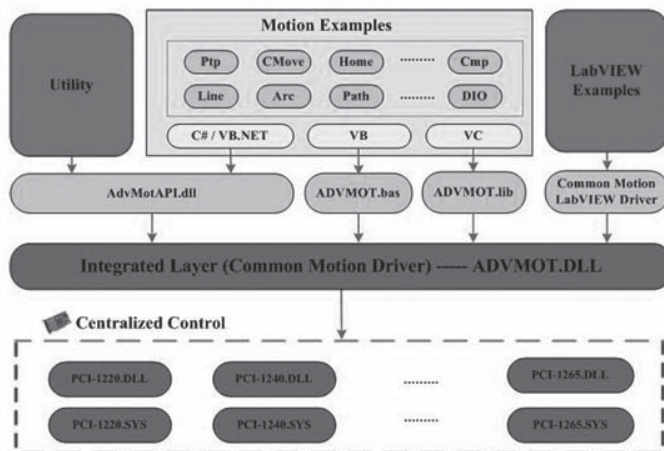


Common Motion API Introduction

Architecture and Features of Common Motion API

Advantech's New Generation Motion Control Software

System integrators often encounter difficulties when an engineer may not be familiar with the different syntaxes during the integration of various motion control cards. And what bother them the most is that when the system has to be upgraded, the problems often occur with rewriting the program as well as increasing the development time. To reduce these difficulties, Advantech has introduced a unified interface - Common Motion API- which provides a single syntax and interface, regardless of the types of motion control card the integrator chooses to use. The design can proceed under a single syntax interface to save development time and speed up the time to market. The ACM (Advantech Common Motion) architecture defines a single interface which consists of three types of operation objects, including Device, Axis and Group and each object has its own Property, Method and State.



Features of Common Motion API

- Provides complete debugging tool utility
 - Hardware wiring testing
 - Software functional testing
 - Condition & status monitoring
- Provides the dedicated APIs for different applications
- Simplifies API calls process
- Improves the integration
- Supports scalable hardware
 - Supports the existing hardware and future hardware development, such as PCI-1245/45E/45L/65/85/85E series

Through the above advantages and the lower learning threshold, integrators can significantly reduce development time and follow-up maintenance work!

5 Compositions in Common Motion API

1. Easy-understanding Naming Rule

Property

- FT_XXX: Feature Property
- CFG_XXX: Configuration Property
- PAR_XXX: Parameter Property

Method

- Acm_DevXXX(): Use 'Device' as a control unit
- Acm_AxXXX(): Use 'Axis' as a control unit
- Acm_GpXXX(): Use 'Group' as a control unit

Event

- EVT_DevXXX
- EVT_AxXXX
- EVT_GpXXX

2. Object-oriented Interface

3 Categories of Property

- Feature Property
- Configuration Property
- Parameter Property

3 Categories of Method

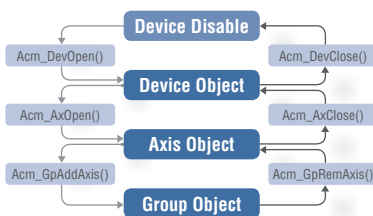
- Use 'Device' as a control unit
- Use 'Axis' as a control unit
- Use 'Group' as a control unit

3 Categories of Event

- EVT_DevXXX
- EVT_AxXXX
- EVT_GpXXX

3. Clear Motion Control Unit

- Single-axis: Axis Object
- Multi-axis: Group Object
- DI/O, AI/O: Device Object



4. Simple Integer Type

- U/I/F stands for different types of integers and the following numbers stand for bits.

New Type	Windows Data Type	Description
U8	UCHAR	8-bit unsigned integer
U16	USHORT	16-bit unsigned integer
U32	ULONG	32-bit unsigned integer
U64	ULONGLONG	64-bit unsigned integer
I8	CHAR	8-bit signed integer
I16	SHORT	16-bit signed integer
I32	INT	32-bit signed integer
I64	LONGLONG	64-bit signed integer
F32	FLAOT	32-bit Floating point variable
F64	DOUBLE	64-bit Floating point variable

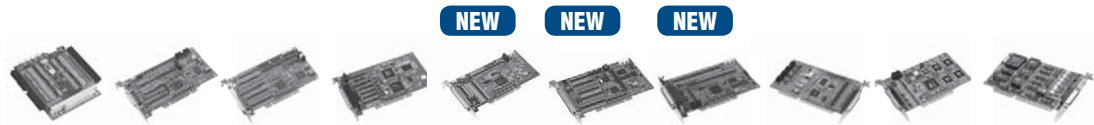
- Example: U32 Acm_AxMoveRel (U32 AxisHandle, PF64 Distance)

5. Detailed Error Classification

No	Error Code	Classification	Description
1	0	Success	Set up successfully
2	0x01000001~0x01000fff	Warning	The parameter is incorrect but do not affect performance
3	0x80000xxx	Function Error	Cannot execute because the parameter is incorrect
4	0x80001xxx	Communication Error	Cannot execute because of communication errors
5	0x80002xxx	Motion Error	Cannot execute because of motion errors
6	0x80003xxx	DAQ Error	Cannot execute because of data acquisition errors

Centralized Motion Control Solution Selection Guide

Centralized Motion Control Solutions



Category		Motion Control								Encoder	
Bus		PC/104	PCI						ISA	PCI	ISA
Model		PCM-3240	PCI-1220U	PCI-1240U	PCI-1243U	PCI-1245L	PCI-1245E PCI-1285E	PCI-1245 PCI-1265 PCI-1285	PCL-839+	PCI-1784U	PCL-833
Axis	Number of Axis	4	2	4	4	4	4/8	4/6/8	3	-	-
	Linear Interpolation	✓	✓	✓	-	✓	✓	✓	-	-	-
	2-axis Circle Interpolation	✓	✓	✓	-	-	-/✓	✓	-	-	-
Advanced Functions	Encoder Channels	4	2	4	-	4	4/8	4/6/8	-	4	3
	Limit Switch Input Channels	8	4	8	8	8	8/16	8/12/16	6	-	-
	Home Input Channels	4	2	4	4	4	4/8	4/6/8	3	-	-
	Emergency Stop Input Channels	1	1	1	1	1	1	1	-	-	-
	Slow Down Limit Switches	8	4	8	-	8	8/16	8/12/16	6	-	-
	General Purpose DI Channels	12	6	12	8	16	16/32	16/32/32	16	4	2
	Servo On Output Channels	4	2	4	-	4	4/8	4/6/8	-	-	-
	General Purpose DO Channels	16	8	16	8	16	16/32	16/32/32	16	4	-
	Analog Input Channels	-	-	-	-	-	-	2 (PCI-1265 only)	-	-	-
	BoardID Switch	✓	✓	✓	✓	✓	✓	✓	-	✓	-
	Position Compare Event	✓	✓	✓	-	-	-	✓	-	-	-
	Position Latch	-	-	-	-	-	-	✓	-	-	-
Dimensions (mm)		96 x 90	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	185 x 100	185 x 100	185 x 100
Connector		2 x 50-pin IDC	50-pin SCSI	100-pin SCSI	DB62	100-pin/ 200-pin SCSI	100-pin SCSI 2x100-pin SCSI	100-pin SCSI 2x100-pin SCSI	1 x DB37 2 x 20-pin	DB37	1 x DB25
Wiring Boards		ADAM-3950	ADAM-3952 ADAM-3955 ADAM-3956	ADAM-3952 ADAM-3955 ADAM-3956	ADAM-3962	ADAM-3952 ADAM-3955 ADAM-3956	ADAM-3952 ADAM-3955 ADAM-3956	ADAM-3952 ADAM-3955 ADAM-3956	ADAM-3937 ADAM-3920	ADAM-3937	ADAM-3925
Page		2-21	2-21	2-21	2-22	2-20	2-19	2-16/ 2-17/2-18	online	online	online

Embedded Motion Controller



Model		PEC-3240
CPU		Celeron M 1.0 GHz CPU
Onboard RAM		512 MB DDR SDRAM
Operating Systems		Windows XP Embedded
Motion Axis	Number of Axis	4
	Linear Interpolation	✓
	2-axis Circle Interpolation	✓
	General Inputs	12 (INO ~ 2 of each axis)
	General Outputs	16 (OUT4 ~ 7 of each axis)
Analog Input Channel		-
Analog Output Channel		-
Isolated Digital Input Channel		16
Isolated Digital Output Channel		16
Isolated Counter Channel		-
Page		2-15

Distributed Motion Control Solution Selection Guide

AMONet Motion Master Cards



Model		PCI-1202U	PCM-3202P
Bus		PCI	PC/104+
Advanced Functions	General Purpose DI Channels	8	-
	General Purpose DO Channels	4	-
	Remote Motion	✓	✓
	Remote I/O	✓	✓
Dimensions (L x H)		175 x 100 mm	96 x 90 mm
Connectors		2 x RJ45	4 x 10-pin box header
Digital I/O Slave Modules		AMAX-1752, AMAX-1754, AMAX-1756, AMAX-2752SY, AMAX-2754SY, AMAX-2756SY	
Motion Slave Modules		AMAX-1220, AMAX-1240, AMAX-2241/PMA, AMAX-2242/J2S, AMAX-2243/YS2	
Page		2-20	2-20

AMONet Motion Slave Modules



Model		AMAX-1220	AMAX-1240	AMAX-2241/PMA	AMAX-2242/J2S	AMAX-2243/YS2
Axis	Number of Axis	2	4	4	4	4
	Linear Interpolation	✓	✓	✓	✓	✓
	2-axis Circle Interpolation	✓	✓	✓	✓	✓
Advanced Functions	Encoder Channels	2	4	4	4	4
	Limit Switch Input Channels	4	8	8	8	8
	Home Input Channels	2	4	4	4	4
	Emergency Stop Input Channels	1	1	1	1	1
	Slow Down Limit Switches	4	8	8	8	8
	Servo On Output Channels	2	4	4	4	4
	BoardID Switch	✓	✓	✓	✓	✓
	Position Compare Event	-	✓	✓	✓	✓
	Position Latch	-	✓	✓	✓	✓
	Simultaneously Start/Stop among Modules	✓	✓	-	-	-
Power Consumption		2 W @ 24 V typical		5 W @ 24 V typical		
Dimensions (L x W x H)		141 x 108 x 60 mm		125 x 47.6 x 151 mm		
Page		2-21	2-21	2-23	2-23	2-23

Isolated Digital I/O Slave Modules



Model	AMAX-1752	AMAX-1754	AMAX-1756	AMAX-2752SY	AMAX-2754SY	AMAX-2756SY
Isolated Digital Input Channels	32	-	16	32	-	16
Isolated Digital Output Channels	-	32	16	-	32	16
Typical Power Consumption	600 mW			1.2 W		
Maximum Power Consumption	2 W			5 W		
Dimensions (L x W x H)	141 x 95 x 60 mm			125 x 47.6 x 151 mm		
Page	2-22	2-22	2-22	2-24	2-24	2-24

PEC-3240

**Intel® Celeron® M 1.0 GHz 4-axis
Embedded Motion Controller
with 32-ch Digital I/O**



Features

- Onboard Celeron® M 1.0 GHz CPU
- 2 x RS-232 ports
- Two 10/100Base-T RJ45 ports
- 2 x USB ports (one with lockable cable mechanism)
- Independent 4-axis motion control
- 32-ch isolated Digital I/O (16-ch inputs and 16-ch outputs)
- 2/3-axis linear, 2-axis circular interpolation function
- Continuous interpolation
- Up to 4 Mpps output; up to 1 MHz encoder input
- Two pulse output types: CW/CCW or pulse/direction
- Two encoder pulse input types: A/B or CW/CCW

Introduction

PEC-3240 is a standalone embedded motion controller that provides 4-axis motion and 32 isolated digital inputs/outputs. This controller also supports serial communication ports and several other networking interfaces. The Windows XP Embedded OS offers a pre-configured image with optimized onboard device drivers. You can seamlessly integrate your applications into Windows XP Embedded and speed up your system development with this application ready controller.

Specifications

General

- Certification** CE, FCC Class A
- Dimensions (W x D x H)** 255 x 152 x 59 mm (10" x 6.0" x 2.3")
- Power Consumption** 24 W (Typical)
- Power Requirements** 10 ~ 30 V_{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT
- Weight** 2.4 kg (Typical)
- OS Support** Windows XP Embedded, Windows 2000/XP

System Hardware

- CPU** Celeron M 1.0 GHz
- Memory** 512 MB DDR SDRAM
- Indicators** LEDs for Power, IDE and LAN (Active, Status)
- Keyboard/Mouse** 1 x PS/2
- Storage** SSD: 2 x internal type I/II CompactFlash® slot

I/O Interface

- Serial Ports** 2 x RS-232 with DB9 connectors
- Serial Port Speed** 50 ~ 115.2 kbps
- LAN** 2 x 10/100Base-T RJ45 ports
- USB Ports** 2 x USB, EHCI, Rev. 2.0 compliant

Pulse Type Motion Control

- Number of Axis** 4
- Interpolation** 2-axis linear, 3-axis linear, 2-axis circular
- Max. Output Speed** 4 Mpps
- Step Count Range** ±2, 147, 483, 646
- Pulse Output Type** CW/CCW or pulse/direction
- Velocity Profiles** T-Curve, S-Curve
- Local I/O** PEL x 4, MEL x 4, ORG x 4, ALM x 4, INP x 4, CMP x 4
- General Inputs** 12 (INO ~ 2 of each axis)
- General Outputs** 16 (OUT4 ~ 7 of each axis)

Encoder Interface

- Input Type** Quadrature (x1, x2, x4 A/B phase) or CW/CCW
- Input Range** 5 ~ 25 V
- Isolation Protection** 1,000 V_{DC}
- Max. Input Frequency** 1 MHz

Isolated Digital Input

- Channels** 16
- Input Voltage** Logic 0: 2 V max.; Logic 1: 5 V min. (24 V max.)
- Isolation Protection** 1,000 V_{DC}

Isolated Digital Output

- Channels** 16
- Output Type** Sink Type (NPN)
- Output Voltage** 5~40 V max.
- Sink Current** 200 mA max. per channel
- Isolation Protection** 1,000 V_{DC}

Environment

- Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- Operating Temperature** -10 ~ 65°C (14 ~ 149°F) @ 5 ~ 85% RH
- Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)
- Shock Protection** IEC 68 2-27
- Vibration Protection** CompactFlash: 50 G @ wall mount, half sine, 11 ms
IEC 68 2-64 (Random 1 Oct./min, 1hr/axis.)
CompactFlash: 2 Grms @ 5 ~ 500 Hz

Ordering Information

- PEC-3240-AE** Celeron M 1 GHz 4-axis Motion Controller w/ DIO

Accessories

- PCL-10251-1E/3E** 100-pin SCSI to Two 50-pin SCSI Cable, 1m/3m
- PCL-10125-1E/3E** DB25 Cable, 1m/3m
- ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- ADAM-3955-AE** 50-pin DIN-rail SCSI 2-axis Motion Wiring Board
- ADAM-3952-AE** 50-pin DIN-rail SCSI and Box Header Board
- ADAM-3925-AE** DB25 DIN-rail Wiring Board
- PCL-10153PA5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- PCL-10153PA5LS-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- PCL-10153YS5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- PCL-10153MJ3-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

1
WebAccess+ Solutions

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Motion Control

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Power & Energy
Automation

4
Automation Software

5
Operator Panels

6
Automation Panel PCs

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Industrial Panel
Computers & Panel PC

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Industrial Monitors

9
Industrial Wireless
Solutions

10
Industrial Ethernet
Solutions

11
Serial Device Servers
and IP Gateways

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Serial Communication
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Embedded Automation
Computers

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PACs

15
Compact PCI Systems

16
M2M I/O Modules

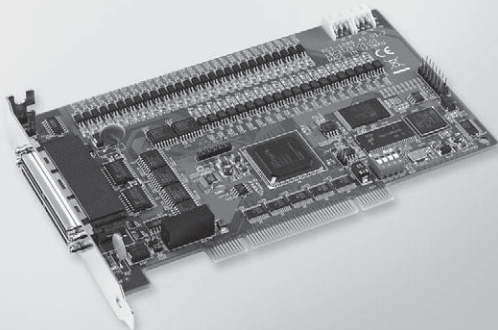
17
RS-485 I/O Modules

18
Ethernet I/O Modules

PCI-1285

DSP-based 8-axis Stepping and Servo Motor Control Universal PCI Card

NEW



RoHS
compliant
CE FCC

Features

- Encoder input is 10 MHz for 4xAB mode, 2.5 MHz for CW/CCW mode
- Pulse output up to 5 Mpps
- Memory buffer (10K points) for trajectory planning which is designed in DSP
- Supports E-Gear, and helical interpolation
- Supports E-CAM providing 256 points to describe the CAM profiles which buffers located in DSP
- Hardware emergency input
- Watchdog timer
- Position latch
- Position compare triggering up to 100 KHz, and memory buffer is up to 100 K points in DSP
- Programmable interrupt
- Supports gantry mode by semi-closed loop pulse train control
- RDY/LTC-dedicated input channels & SVON/CMP/CAM-DO/ERC-dedicated output channels are switchable for general input and output purposes

Introduction

PCI-1285 is a 8-axis universal PCI (supporting both 3.3 V and 5 V signal slot) stepping/pulse-type servo motor control card designed for applications which need to control interpolation, synchronization among multiple axes, continuous contouring and high speed triggering to integrated machine vision solution. PCI-1285 utilizes the high-performance DSP and FPGA to calculate the motion trajectories, synchronization timing control for multiple axes and input/output handling to offer functionality, such as up to 8-axis linear interpolation, 2- axis circular interpolation, helical interpolation, T/S-curve acceleration/deceleration rate and so on. In addition, Advantech supplies a Common Motion API library, graphical utility and user-friendly examples to decrease programming load, helping users complete configuration and diagnosis easily.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo/stepping
- **Number of Axes** 8
- **Interpolation** 2 to 8-axis linear, 2-axis circular, X-Y plane with Z thread helical interpolation
- **Max. Output Speed** 5 Mbps
- **Step Count Range** $\pm 2, 147, 483, 646$
- **Pulse Output Type** Pulse/direction (1-pulse, 1-direction type) or CW/CCW (2-pulse type)
- **Position Counters** Range of command and actual position
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O**
 - Machine Interfaces: LMT+, LMT-, ORG
 - Servo Driver Interfaces: ALM, INP
 - Position Compare I/O: CMP
 - General Digital I/O: 32-ch DI, 32-ch DO

Encoder Interface

- **Input Type** Quadrature (A/B phase) or up/down
- **Counts per Enc. Cycle** x1, x2, x4 (A/B phase only)
- **Input Range** 5 ~ 10 V
- **Isolation Protection** 2,500 V_{DC}
- **Max. Input Frequency** 10 MHz under 4xAB mode

General

- **Bus Type** Universal PCI V2.2
- **Connectors** 2 x 100-pin mini-SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
 - Typical: 5 V @ 300 mA
 - 3.3 V @ 1.2 A
 - Max.: 5 V @ 400 mA
 - 3.3 V @ 1.5 A
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

- **• PCI-1285-AE** 8-axis Stepping/Servo Control Universal PCI Card

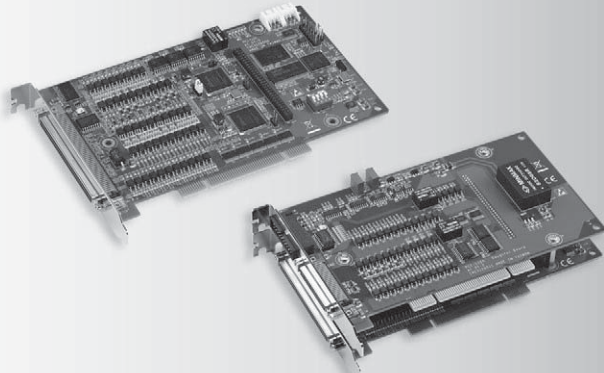
Accessories

- **ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- **ADAM-39100-AE** 100-pin DIN-rail SCSI Wiring Board
- **PCL-101100SB-1E** Mini-SCSI-100 Shielded Cable, 1m
- **PCL-101100SB-2E** Mini-SCSI-100 Shielded Cable, 2m
- **PCL-101100SB-3E** Mini-SCSI-100 Shielded Cable, 3m
- **PCL-10153PA5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- **PCL-10153PA5LS-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- **PCL-10153YS5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- **PCL-10153MJ3-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- **PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

PCI-1245 PCI-1265

DSP-based 4/6-axis Stepping and Servo Motor Control Universal PCI Card

NEW



PCI-1245

PCI-1265



Features

- Encoder input is 10 MHz for 4xAB mode, 2.5 MHz for CW/CCW mode
- Pulse output up to 5 Mpps
- Memory buffer (10K points) for trajectory planning which is designed in DSP
- Supports E-Gear, and helical interpolation
- Supports E-CAM providing 256 points to describe the CAM profiles which buffers located in DSP
- Hardware emergency input
- Watchdog timer
- Position latch
- Position compare triggering up to 100 KHz, and memory buffer is up to 100 K points in DSP
- Programmable interrupt
- Supports gantry mode by semi-closed loop pulse train control
- RDY/LTC-dedicated input channels & SVON/CMP/CAM-DO/ERC-dedicated output channels are switchable for general input and output purposes

Introduction

PCI-1245/1265 is a 4/6-axis universal PCI (supporting both 3.3 V and 5 V signal slot) stepping/pulse-type servo motor control card designed for applications which need to control interpolation, synchronization among multiple axes, continuous contouring and high speed triggering to integrated machine vision solution. PCI-1245/ PCI-1265 utilizes the high-performance DSP and FPGA to calculate the motion trajectories, synchronization timing control for multiple axes and input/output handling to offer functionality, such as up to 4/6 -axis linear interpolation, 2- axis circular interpolation, helical interpolation, T/S-curve acceleration/deceleration rate and so on. In addition, Advantech supplies a Common Motion API library, graphical utility and user-friendly examples to decrease programming load, helping users complete configuration and diagnosis easily.

Specifications

Pulse Type Motion Control

- Motor Driver Support** Pulse-type servo/stepping
- Number of Axes** PCI-1245: 4
PCI-1265: 6
- Interpolation** PCI-1245: 2 to 4-axis linear, 2-axis circular, X-Y plane with Z thread helical interpolation
PCI-1265: 2 to 6-axis linear, 2-axis circular, X-Y plane with Z thread helical interpolation
- Max. Output Speed** 5 Mbps
- Step Count Range** $\pm 2, 147, 483, 646$
- Pulse Output Type** Pulse/direction (1-pulse, 1-direction type) or CW/CCW (2-pulse type)
- Position Counters** Range of command and actual position
- Velocity Profiles** T-Curve, S-Curve
- Local I/O** Machine Interfaces: LMT+, LMT-, ORG
Servo Driver Interfaces: ALM, INP
Position Compare I/O: CMP
General Digital I/O: PCI-1245: 16-ch DI, 16-ch DO (RDY/LTC pin can be switchable to general-purpose input and CAM-DO/ CMP/SVON/ ERC pin to general-purpose output)
PCI-1265: 32-ch DI, 32-ch DO (RDY/LTC pin can be switchable to general-purpose input and CAM-DO/ CMP/SVON/ ERC pin to general-purpose output)
PCI - 1265: 2
- Analog Input**

Encoder Interface

- Input Type** Quadrature (A/B phase) or up/down
- Counts per Enc. Cycle** x1, x2, x4 (A/B phase only)
- Input Range** 5 ~ 15 V
- Isolation Protection** 2,500 V_{DC}
- Max. Input Frequency** 10 MHz under 4xAB mode

General

- Bus Type** Universal PCI V2.2
- Connectors** PCI-1245: 1 x 100-pin SCSI female connector
PCI-1265: 1 x 100-pin SCSI female connector & 1 x 50-pin SCSI female connector
- Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- Power Consumption** Typical: 5 V @ 850 mA
Max.: 5 V @ 1 A
- Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

- PCI-1245-AE** 4-axis Stepping/Servo Control Universal PCI Card
- PCI-1265 AE** 6-axis Stepping/Servo Control Universal PCI Card

Accessories

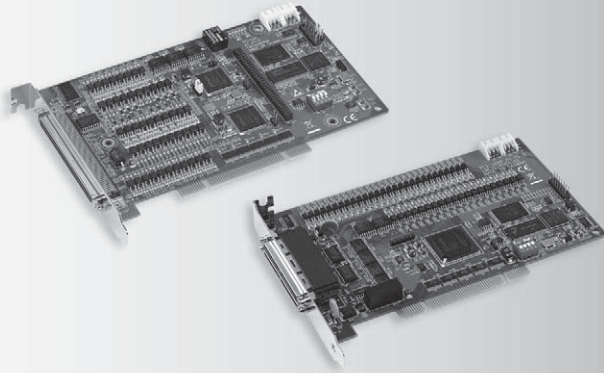
- ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- ADAM-3955-AE** 50-pin DIN-rail SCSI 2-axis Motion Wiring Board
- ADAM-3952-AE** 50-pin DIN-rail SCSI and Box Header Board
- ADAM-39100-AE** 100-pin DIN-rail SCSI Wiring Board
- PCL-10152-1E/3E** 50-pin SCSI M-M Shielded Cable, 1m/3m
- PCL-101100M-1E/2E/3E** 100-pin SCSI Cable, 1m/2m/3m
- PCL-10251-1E/3E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m/3m
- PCL-10153PA5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- PCL-10153PA5LS-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- PCL-10153YS5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- PCL-10153MJ3-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

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PCI-1245E PCI-1285E

Economic DSP-based 4/8-axis Stepping and Servo Motor Control Universal PCI Card

NEW



PCI-1245E

PCI-1285E



Features

- Encoder input is 10 MHz for 4xAB mode, 2.5 MHz for CW/CCW mode
- Pulse output up to 5 Mpps
- Memory buffer for trajectory planning (circular trajectory and auto blending are not supported)
- Supports E-Gear
- Hardware emergency input
- Watchdog timer
- Position latch
- Programmable interrupt
- RDY/LTC-dedicated input channels & SVON/CMP/CAM-DO/ERC-dedicated output channels are switchable for general input and output purposes

Introduction

PCI-1245E/1285E is a 4/8-axis economic universal PCI (supporting both 3.3 V and 5 V signal slot) stepping/pulse-type servo motor control card designed for entry-level applications which need to control linear interpolation, electronic gear, continuous contouring (circular trajectories and auto blending are excluded). PCI-1245E/1285E utilizes the high-performance DSP and FPGA to calculate the motion trajectories, synchronization timing control for multiple axes and input/output handling to offer functionality, such as 2–8-axis linear interpolation, E-Gear (only for PCI-1245E), T/S-curve acceleration/deceleration rate, speed override, 16 home modes and so on. In addition, Advantech supplies a Common Motion API library, graphical utility and user-friendly examples to decrease programming load, helping users complete configuration and diagnosis easily.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo/stepping
- **Number of Axis** PCI-1245E: 4
PCI-1285E: 8
- **Interpolation** PCI-1245E: 2-axis linear
PCI-1285E: 2-axis linear
- **Max. Output Speed** 5 Mbps
- **Step Count Range** $\pm 2, 147, 483, 646$
- **Pulse Output Type** Pulse/direction (1-pulse, 1-direction type) or CW/CCW (2-pulse type)
- **Position Counters** Range of command and actual position
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O**
Machine Interfaces: LMT+, LMT-, ORG
Servo Driver Interfaces: ALM, INP
General Digital I/O: PCI-1245E: 16-ch DI, 16-ch DO
PCI-1285E: 32-ch DI, 32-ch DO

Encoder Interface

- **Input Type** Quadrature (A/B phase) or up/down
- **Counts per Enc. Cycle** x1, x2, x4 (A/B phase only)
- **Input Range** PCI-1245E 5~15V
PCI-1285E 5~10V
- **Isolation Protection** 2,500 V_{DC}
- **Max. Input Frequency** 10 MHz under 4xAB mode

General

- **Bus Type** Universal PCI V2.2
- **Connectors** PCI-1245E: 1 x 100-pin SCSI female connector
PCI-1285E: 2 x 100-pin mini-SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")

- **Power Consumption** PCI-1245E: Typical: 5 V @ 850 mA
Max.: 5 V @ 1 A
PCI-1285E: Typical: 5 V @ 530 mA
3.3 V @ 160 mA
Max.: 5 V @ 500 mA
3.3 V @ 1 A
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

- **PCI-1245E-AE** Economic 4-axis Stepping/Servo Control Universal PCI Card
- **PCI-1285E-AE** Economic 8-axis Stepping/Servo Control Universal PCI Card

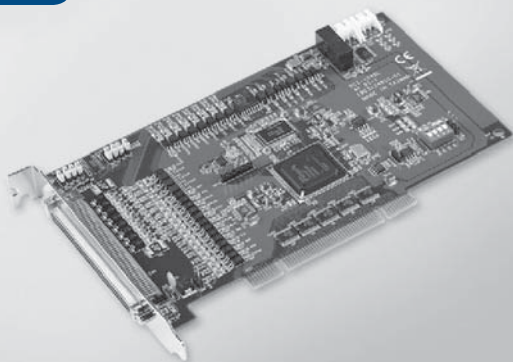
Accessories

- **ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- **ADAM-3955-AE** 50-pin DIN-rail SCSI 2-axis Motion Wiring Board
- **ADAM-39100-AE** 100-pin DIN-rail SCSI Wiring Board
- **PCL-101100M-1E/2E/3E** 100-pin SCSI Cable, 1m/2m/3m
- **PCL-10251-1E/3E** 100-pin SCSI to Two 50-pin SCSI Cable, 1m/3m
- **PCL-101100SB-1E/2E/3E** Mini-SCSI-100 Shielded Cable, 1m/2m/3m (for PCI-1285E)
- **PCL-10153PA5-2E** DB-26 pin to SCSI-50 pin 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- **PCL-10153PA5LS-2E** DB-26 pin to SCSI-50 pin 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- **PCL-10153YS5-2E** DB-26 pin to SCSI-50 pin 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- **PCL-10153MJ3-2E** DB-26 pin to SCSI-50 pin 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- **PCL-10153DA2-2E** DB-26 pin to SCSI-50 pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

PCI-1245L

4-axis Stepping and Servo Motor Control Universal PCI Card

NEW



Features

- Encoder input is 4 MHz for 4xAB mode, 1 MHz for CW/CCW mode
- Pulse output up to 1 Mpps and the output type can be switched to differential or single-end by jumper setting
- Supports 2 axis linear interpolation
- Supports T/S-curve
- Supports speed override
- Hardware emergency input
- Watchdog timer
- Supports programmable acceleration/deceleration rate
- Programmable interrupt
- RDY dedicated input channels & SVON/ERC dedicated output channels are switchable for general input and output purposes

Introduction

The PCI-1245L is a 4-axis universal PCI card (supporting both 3.3 V and 5 V signal slots) stepping/pulse-type servo motor control card designed for entry-level applications which need to control interpolation, synchronization among multiple axes, with SoftMotion algorithm inside to perform the motion trajectory and precise movement. The PCI-1245L utilizes the high-performance FPGA to calculate the motion trajectories, synchronization timing control for multiple axes and input/output handling to offer functionality, such as 2 axis linear interpolation, T/S-curve, speed override, programmable acceleration/deceleration rate, 16 home modes and so on.

In addition, all Advantech motion controllers use the "Common Motion API" architecture which is a unified user programming interface and graphical utility. This architecture saves application maintenance and upgrades. Programmers can benefit from integrating any Advantech SoftMotion controller without changing large amounts of the application code. User-friendly examples decrease programming load, helping users complete configuration and diagnosis easily.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo/stepping
- **Number of Axes** 4
- **Interpolation** 2-axis linear interpolation
- **Max. Output Speed** 1 Mbps
- **Step Count Range** $\pm 2, 147, 483, 646$
- **Pulse Output Type** Pulse/direction (1-pulse, 1-direction type), CW/CCW (2-pulse type) or single-ended +5V output
- **Position Counters** Range of command and actual position
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O**
 - Machine Interfaces: LMT+, LMT-, ORG
 - Servo Driver Interfaces: ALM, INP
 - General Digital I/O: 16-ch DI, 16-ch DO (RDY pin can be switchable to general-purpose input and SVON/ERC pin to generalpurpose output)

Encoder Interface

- **Input Type** Quadrature (A/B phase) or up/down
- **Counts per Enc. Cycle** x1, x2, x4 (A/B phase only)
- **Input Range** 5~10 V
- **Isolation Protection** 2,500 V_{oc}
- **Max. Input Frequency** 4 MHz for 4xAB mode

General

- **Bus Type** Universal PCI V2.2
- **Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
 - Typical: 5 V @ 0.6 A
 - Max.: 5 V @ 1 A
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

- **PCI-1245L-AE** 4-axis Stepping/Pulse-type Servo Motor Control Universal PCI Card

Accessories

- **ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- **ADAM-3955-AE** 50-pin DIN-rail SCSI 2-axis Motion Wiring Board
- **ADAM-3952-AE** 50-pin DIN-rail SCSI and Box Header Board
- **ADAM-39100-AE** 100-pin DIN-rail SCSI Wiring Board
- **ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board
- **PCL-10251-1E/3E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m/3m
- **PCL-10153PA5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- **PCL-10153PA5LS-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- **PCL-10153YS5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- **PCL-10153MJ3-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- **PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

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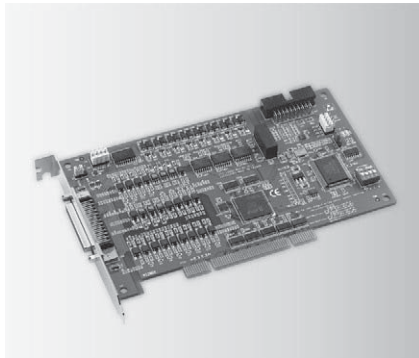
16
M2M I/O Modules

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RS-485 I/O Modules

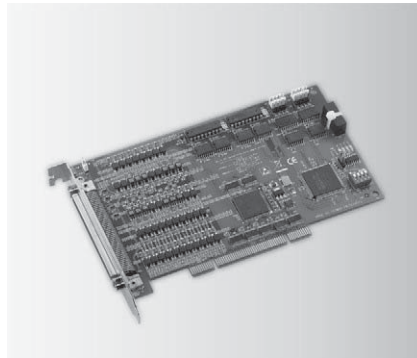
18
Ethernet I/O Modules

PCI-1220U PCI-1240U PCM-3240

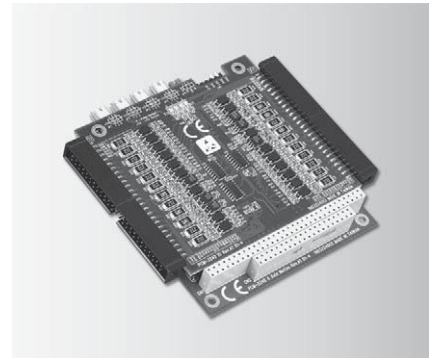
**2-axis Stepping and Servo Motor
Control Universal PCI Card**
**4-axis Stepping and Servo Motor
Control Universal PCI Card**
**4-axis Stepping and Servo Motor
Control PC/104 Card**



RoHS
compliant
CE FCC



RoHS
compliant
CE FCC



RoHS
compliant
CE FCC

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo/stepping
- **Number of Axis** 4
- **Interpolation** 2-axis linear, 3-axis linear, 2-axis circular (PCI-1240U, PCM-3240)
2-axis linear, 2-axis circular (PCI-1220U)
- **Max. Output Speed** 4 Mpps
- **Step Count Range** $\pm 2, 147, 483, 646$ (32-bit)
- **Pulse Output Type** Pulse/direction (1-pulse, 1-direction type), or CW/CCW (2-pulse type)
- **Position Counters** Range of command and actual position
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O** Machine Interfaces: LMT+, LMT-, ORG
Servo Driver Interfaces: ALM, RDY, SVON, INP
Position Compare I/O: CMP
General Digital I/O: 12-ch DI, 16-ch DO

Encoder Interface

- **Input Type** Quadrature (A/B phase or up/down)
- **Counts /Enc. Cycle** x1, x2, x4 (A/B phase only)
- **Input Range** 5 ~ 25 V
- **Isolation Protection** 2,500 V_{DC}
- **Max. Input Freq.** 1 MHz

General

- **Bus Type** PC/104
- **Certification** CE, FCC Class A
- **Connectors** 2 x IDC 50-pin male connector
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 850 mA
Max.: 5 V @ 1 A
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temp.** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temp.** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

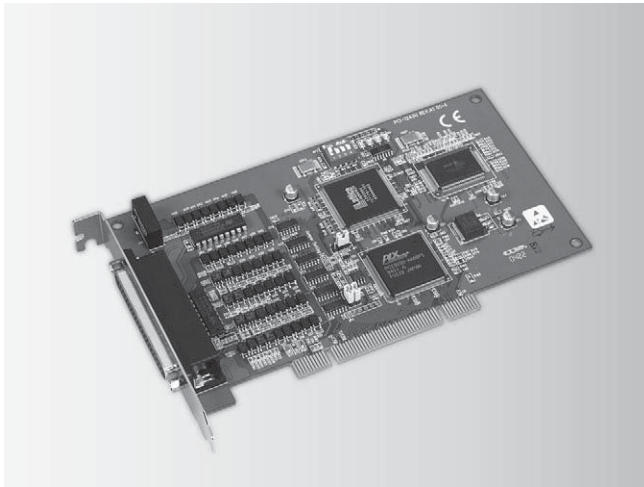
- **PCI-1220U-AE** 2-axis Stepping and Servo Motor Control Universal PCI Card
- **PCI-1240U-B2E** 4-axis Stepping and Servo Motor Control Universal PCI Card
- **PCM-3240-AE** 4-axis Stepping and Servo Motor Control PC/104 Card

Accessories

- **ADAM-3956-AE** 100-pin DIN-rail SCSI 4-axis Motion Wiring Board (PCI-1240U only)
- **ADAM-3955-AE** 50-pin DIN-rail SCSI 2-axis Motion Wiring Board (PCI-1220U/1240U)
- **ADAM-3952-AE** 50-pin DIN-rail SCSI and Box Header Board (PCI-1220U/1240U)
- **ADAM-3950-AE** 50-pin DIN-rail Flat Cable Wiring Board (PCM-3240 only)
- **ADAM-39100-AE** 100-pin DIN-rail SCSI Wiring Board (PCI-1240U only)
- **PCL-101100M-1E/2E/3E** 100-pin SCSI Cable, 1m/2m/3m (PCI-1240U only)
- **PCL-10150-1.2E** IDC-50 Flat Cable, 1.2m (PCM-3240 only)
- **PCL-10152-1E/3E** 50-pin SCSI M-M Shielded Cable, 1m/3m (PCI-1220U only)
- **PCL-10251-1E/3E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m/3m (PCI-1240U only)
- **PCL-10153PA5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic A4 and A5 Servo, 2 m
- **PCL-10153PA5LS-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Panasonic MINAS A Servo, 2 m
- **PCL-10153YS5-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Yaskawa Sigma V Servo, 2 m
- **PCL-10153MJ3-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Mitsubishi J3 Servo, 2 m
- **PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

PCI-1243U

4-axis Stepping Motor Control Universal PCI Card



Features

- 4 axis stepping motor control
- PCI universal bus
- Up to 400 k pulse output rate
- T-Curve acceleration/deceleration
- Pulse/Dir and CW/CCW pulse output mode
- Up 24-bit step count
- Opto-Isolated Digital input and output
- Up to 1,500 V_{RMS} system isolation
- BoardID switch

Introduction

PCI-1243U is a 4-axis stepping motor control card with universal PCI interface. Each axis can be controlled directly through the card's I/O registers. This board is economic solution for stepping motor which provides 4 channels pulse train, T/S speed profile, on-the-fly velocity change and so on. The board is supplied with DLL library for Windows programmer to write the program. With the DLL driver, you can easily link to VC++®, Visual Basic® or BCB.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Stepping
- **Number of Axis** 4
- **Max. Output Speed** 400 kpps
- **Step Count Range** 0 ~ 16, 777, 215
- **Pulse Output Type** Pulse/Direction, CW/CCW
- **Position Counters** ±16, 777, 215
- **Home Modes** 4
- **Velocity Profiles** T-Curve or S-Curve acceleration/deceleration
- **Local I/O Interfaces** PEL x 4, NEL x 4, RG x 4, SLD x 4, EMG x 1
- **General Input Channels** 8
- **General Output Channels** 8

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 1 V
Logic 1: 12 V (24 V max.)
- **Isolation Protection** 3,750 V_{RMS}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 4.7 kΩ

Isolated Digital Output

- **Channels** 8
- **Output Type** Sink (NPN)
- **Isolation Protection** 3,750 V_{RMS}
- **Output Voltage** 5 ~ 30 V_{DC}
- **Sink Current** 200 mA max./channel; 1.1 A max. total
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **Certification** CE, FCC Class A
- **Connectors** 1 x DB-62 female
- **Dimensions** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 340 mA
Max.: 5 V @ 500 mA
- **Storing Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storing Temperature** -20 ~ 80°C (-4 ~ 170°F)

Ordering Information

- **PCI-1243U-AE** 4-axis Stepping Motor Control Card

Accessories

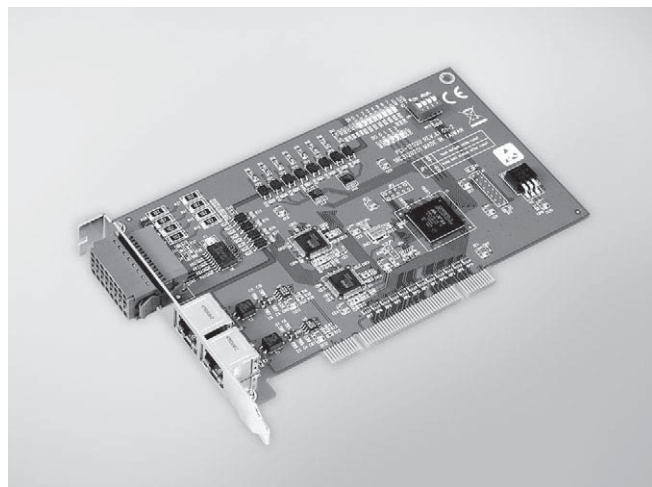
- **PCL-10162-1E** DB-62 Cable Assembly, 1m
- **PCL-10162-3E** DB-62 Cable Assembly, 3m
- **ADAM-3962-AE** DB-62 Wiring Board with DIN-rail Mounting

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PCI-1202U PCM-3202P

2-port AMONet RS-485 PCI Master Card

2-port AMONet RS-485 PC/104+ Master Card



PCI-1202U



Specifications

AMONet RS-485 Motion Control

- **AMONet RS-485** 2 rings
- **Interface** Half duplex RS-485
- **Cable Type** CAT5 UTP/STP Ethernet cable and above
- **Surge Protection** 10 kV
- **Transmission Speeds** 2.5, 5, 10, and 20 Mbps
- **Data Flow Control** Automatic
- **Communication Distance (Max.)** 100 m @ 20 Mbps w/32 slave modules
100 m @ 10 Mbps w/64 slave modules
- **Slave Module** Digital I/O, Motion Control, Analog I/O

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Dry contact (need external voltage source)
- **Isolation Protection** 2,500 V_{DC}
- **Input Resistance** 2.4 kW @ 0.5 W

Isolated Digital Output

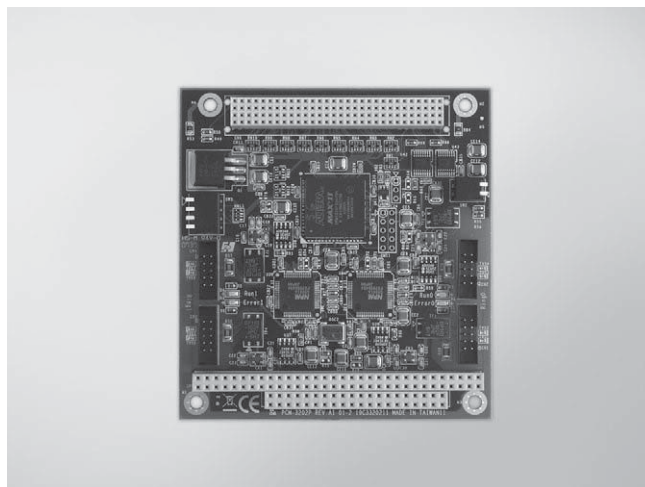
- **Channels** 4
- **Output Type** Open collector
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 10 ~ 30 V_{DC}
- **Sink Current** 1 ch: Max. 0.5 A
4 ch: Max. 1.1 A (total)

General

- **Bus Type** Universal PCI V2.2
- **certification** CE, FCC Class A
- **Connectors** 2 x RJ45
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** 5 V_{DC} @ 0.5 A typical
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temp.** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temp.** -20 ~ 85°C (-4 ~ 185°F)

Ordering Information

- **PCI-1202U-AE** 2-port AMONet RS-485 PCI Master Card



PCM-3202P



Specifications

AMONet RS-485 Motion Control

- **AMONet RS-485** 2 rings
- **Interface** Half duplex RS-485
- **Cable Type** CAT5 UTP/STP Ethernet cable
- **Surge Protection** 10 kV
- **Transmission Speeds** 2.5, 5, 10, and 20 Mbps
- **Data Flow Control** Automatic
- **Communication Distance (Max.)** 100 m @ 20 Mbps w/32 slave modules
- **Slave Module** Digital I/O, Motion Control, Analog I/O

General

- **Bus Type** PC/104+
- **Certification** CE, FCC Class A
- **Connectors** 4 x 10-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** 5 V_{DC} @ 0.5 A typical
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temp.** 0 ~ 60°C (32 ~ 140°F)
- **Storing Temp.** -20 ~ 85°C (-4 ~ 185°F)

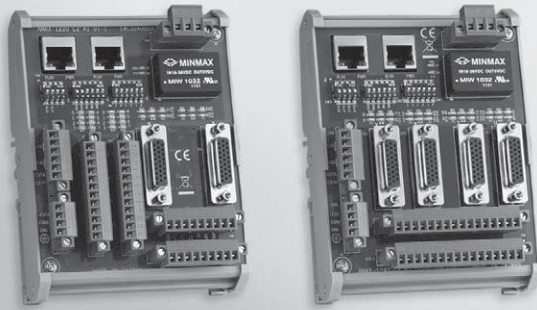
Ordering Information

- **PCM-3202P-AE** 2-port PC/104+ AMONet RS-485 Master Card

AMAX-1220 AMAX-1240

Open Frame Type 2/ 4-axis AMONet Motion Slave Modules

NEW



AMAX-1220

AMAX-1240



Features

- End limit logic is switchable (high or low active)
- BoardID is switchable
- Easily visible LED indicators on board to do diagnosis
- Direct wire to servo drive to save terminal board space while installation
- Max. 6.5 MHz, 4-axis pulse output
- 28 bits counter for incremental encoder
- Horizontal installation for servo or stepping motor driver
- Suitable for DIN-rail mounting

Introduction

AMAX-1220 and AMAX-1240 have compact open frame designs for horizontal placement and an interface connector mounted on the board. With a transfer cable to servo drive, both models can conveniently connect to Mitsubishi J3, Yaskwa Sigma V and Panasonic A4/A5.

The AMAX-1220 is an economic 2-axis AMONet slave module which supports motion functionality in point-to-point (PTP), linear & circular interpolation, simultaneously start/stop among multiple slave modules, and brake signal to servo for emergence consideration. The AMAX-1240 is an advanced 4-axis AMONet slave module which not only supports AMAX-1220 motion functionality, but also supports advanced features in position compare and triggering function. Both linear interval and table setups are supported.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo
- **Number of Axes** AMAX-1220: 2
AMAX-1240: 4
- **Interpolation** Linear and circular
- **Max. Output Speed** 6.5 Mpps
- **Step Count Range** $\pm 134, 217, 728$
- **Pulse Output Type** OUT/DIR, CW/CCW, A/B phase
- **Position Counter** $\pm 134, 217, 728$
- **Home Modes** 13
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O**
 - Machine Interfaces: EL+/-, ORG and SD (Slow Down) for Each Axis
 - Servo Driver Interfaces: ALM, RDY, SVON, INP, Break for Each Axis
 - Position Compare I/O: LTC, CMP for Each Axis(Only available for AMAX-1240-AE)
- Simultaneous Move Within Multiple Modules: CSTA/CSTP (Simultaneously Start/Stop) for each model
- General Purpose I/O: AMAX-1220 supports 8xDI and 8xDO

Encoder Interface

- **Input Type** A/B phase, CW/CCW
- **Counts per Enc. Cycle** x1, x2, x4 (AB phase only)
- **Input Range** Low: 0 ~ 0.5V
High: 3.5 ~ 7V
- **Isolation Protection** 2,500 V_{RMS}
- **Max. Input Frequency** 2 MHz @ 5 V

General

- **Bus Type** AMONet RS-485
- **Certification** CE, FCC Class A
- **Connectors** RJ-45 x 2 are for communication port
DB-26 connector by transfer cable to servo drives. Other are screw terminal type connectors
- **Dimensions (L x W x H)** 141 x 108 x 60 mm (5.6" x 4.3" x 2.4")
- **System Power Consumption**
 - Output Channel Power Consumption 120W typical, 240W max.
 - Input Channel Power Consumption
 - AMAX-1220: 8 W @ 24 V external power (max.)
 - AMAX-1240: 10 W @ 24 V external power (max.)
- **System Power Input** 24 V_{DC} within 200 mV ripple
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)

Ordering Information

- **AMAX-1220-AE** Economic 2-axis AMONet Motion Control Module
- **AMAX-1240-AE** Advanced 4-axis AMONet Motion Control Module

Accessories

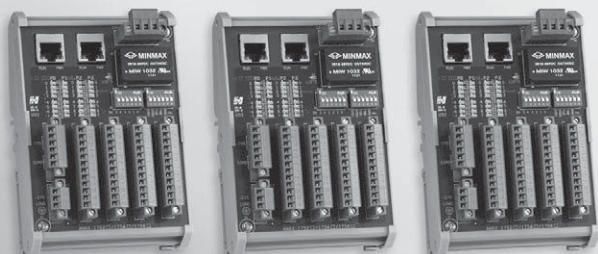
- **PCL-10153PA5-2E** 50-pin Cable to Panasonic A4 and A5 Servo, 2 m
- **PCL-10153PA5LS-2E** 50-pin Cable to Panasonic MINAS A Servo, 2 m
- **PCL-10153YS5-2E** 50-pin Cable to Yaskawa Sigma V Servo, 2 m
- **PCL-10153MJ3-2E** 50-pin Cable to Mitsubishi J3 Servo, 2 m
- **PCL-10153DA2-2E** 50-pin Cable from ADAM-3955/ADAM-3956 to Delta A2 Servo, 2 m

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AMAX-1752 AMAX-1754 AMAX-1756

Open Frame Type 32-ch Isolated Digital Input/Output Slave Modules

NEW



AMAX-1752

AMAX-1754

AMAX-1756



Features

- Communication baud rate, 2.5Mbps, 5Mbps, 10Mbps and 20Mbps are supported and switchable
- Onboard screw terminal for direct wiring
- 2,500 VRMS Isolation voltage
- Suitable for DIN-rail mounting
- BoardID is switchable
- Easily visible LED indicators on board to do diagnosis

Introduction

The AMAX-1752, AMAX-1754 and AMAX-1756 are compact open frame designs for horizontal placement, on-board screw terminal for direct wiring and on-board easily-visible LED indicators are for system diagnosis. All the digital I/O slave modules could be connected and distributed by standard LAN cables thereby saving wiring costs and maintenance. Three models are introduced: 32-ch digital input (AMAX-1752), 32-ch digital output (AMAX-1754) and 16-ch digital input/output (AMAX-1756). According to maximum communication baud rate, 2048 I/O points can be scanned and updated within 1.04 ms.

Specifications

Isolated Digital Input

- **Channels** AMAX-1752: 32
AMAX-1756: 16
- **Input Type** Dry contact
- **Isolation Protection** 2,500 V_{RMS}
- **Opto-Isolator Response** 100 μs (max.)
- **Input Resistance** 3.2kΩ

Isolated Digital Output

- **Channels** AMAX-1754: 32
AMAX-1756: 16
- **Output Type** Sink (NPN) (open collector Darlington transistors)
- **Isolation Protection** 2,500 V_{RMS}
- **Output Voltage** 10 ~ 30 V_{DC}
- **Sink Current** 1 ch: 500 mA (1 port)

General

- **Bus Type** AMONet RS-485
- **Certification** CE, FCC Class A
- **Connectors** (1) RJ-45 x 2 are for communication port
(2) I/O points use screw terminal type connector
- **Dimensions** 141 x 95 x 60 mm (5.6" x 3.7" x 2.4")
- **Power Consumption** 600mW typical, 2 W max.
- **Power Input** 24 V_{DC} within 200 mA ripple
- **Power Supply for DIO** 10 ~ 30 V_{DC} (2A max)
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)

Ordering Information

- **AMAX-1752-AE** Open Frame Type 32-ch Isolated Digital Input AMONet Module
- **AMAX-1754-AE** Open Frame Type 32-ch Isolated Digital Output AMONet Module
- **AMAX-1756-AE** Open Frame Type 16/16-ch Isolated Digital I/O AMONet Module

AMAX-2240 Series

4-axis AMONet Motion Slave Modules



Features

- Max. 20 Mbps transfer rate
- Max. 6.5 MHz, 4-axis pulse output
- 28 bits counter for incremental encoder
- 2 ~ 4-axis linear interpolation
- 2-axis circular interpolation
- T-Curve and S-Curve velocity profiles support
- Change speed on-the-fly
- Easy installation with RJ45 phone jack and LED diagnostic
- Easy installation for servo or stepping motor driver
- Suitable for DIN-rail mounting

Introduction

AMAX-2240 series is used to increase the number of axes for an AMONet RS-485 decentralized motion control network. These extension slave modules connect serially by a simple and affordable Cat.5 LAN cable, reducing the wiring between driver and controller. This is very suitable for highly integrated machine automation applications. Please select cable 20-pin SCSI and plug this cable into the motor driver and motion slave module.

Specifications

Pulse Type Motion Control

- **Motor Driver Support** Pulse-type servo
- **Number of Axis** 4
- **Interpolation** Linear and circular
- **Max. Output Speed** 6.5 Mpps
- **Step Count Range** $\pm 134, 217, 728$
- **Pulse Output Type** OUT/DIR, CW/CCW, A/B phase
- **Position Counter** $\pm 134, 217, 728$
- **Home Modes** 13
- **Velocity Profiles** T-Curve, S-Curve
- **Local I/O**
 - Machine Interfaces: EL+ x 4, EL- x 4, ORG x 4, SD x 4
 - Servo Driver Interfaces: ALM x 4, RDY x 4, SVON x 4, INP x 4, ERC x 4
 - Position Compare I/O: LTC x 4, CMP x 4

Encoder Interface

- **Input Type** A/B phase, CW/CCW
- **Counts per Enc. Cycle** x1, x2, x4 (AB phase only)
- **Input Range** Compatible with TIA/EIA-422 differential line driver
I : ± 20 mA, VOD : ± 2 V/min
- **Isolation Protection** 2,500 V_{RMS}
- **Max. Input Frequency** 2 MHz @ 5 V

General

- **Bus Type** AMONet RS-485
- **Certification** CE, FCC Class A
- **Connectors** AMAX-2242/J2S: 2 x RJ45 and 8 x 20-pin SCSI
AMAX-2241/PMA & AMAX-2243/YS2: 4 x 50-pin SCSI
- **Dimensions (L x W x H)** 125 x 47.6 x 151 mm (4.9" x 1.8" x 5.9")
- **Power Consumption** 5 W @ 24 V typical
- **Power Input** 24 V_{DC} within 200 mV ripple
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)

Ordering Information

- **AMAX-2241/PMA-AE** 4-axis AMONet Motion Module for Panasonic MINAS A
- **AMAX-2242/J2S-AE** 4-axis AMONet Motion Module for Mitsubishi MR-J2S
- **AMAX-2243/YS2-AE** 4-axis AMONet Motion Module for Yaskawa Sigma-II

Accessories

- **PCL-10220M-2E** 20-pin SCSI Cable, 2 m (for AMAX-2242/J2S)
- **PCL-10150M-2E** 50-pin SCSI Cable, 2 m (for AMAX-2241/PMA and AMAX-2243/YS2)
- **ADAM-3940-AE** 40-pin Flat Cable Wiring Board with LED

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AMAX-2750SY Series

32-ch Isolated Digital Input/Output Slave Modules



Features

- Max. 20 Mbps transfer rate
- Onboard terminal for direct wiring
- Easy installation with RJ45 phone jack and LED diagnostic
- LED indicator for each IO channel (switch by SW4)
- Selection of I/O-channel configuration (32-ch DI, 32-ch DO or 16/16-ch Digital I/O)
- 2,500 V_{RMS} Isolation voltage
- Suitable for DIN-rail mounting

Introduction

The AMAX-2750SY series consists of digital slave modules for AMONet RS-485 that extend the digital I/O capacity. All the digital I/O slave extension modules are connected serially with a simple Cat.5 cable. This reduces wiring between driver and controller and is very suitable for highly integrated machine automation applications. High speed, scalability and cost-effectiveness ensures a solid solution for machine builders. There are 3 main types of digital I/O slave modules, 32-ch digital input, 32-ch digital output, and 16/16-ch digital input/output. With these slave modules, you can connect actuators/sensors directly with minimum hassle. You can access I/O points nearby or 100 meters away using simple and low-cost wiring, and the high speed of AMONet RS-485 makes it possible to scan 2,048 I/O channels in 1.04 ms.

Specifications

Isolated Digital Input

- **Channels** AMAX-2752SY: 32 (4 ports)
AMAX-2756SY: 16 (2 ports)
- **Input Type** Dry contact
- **Isolation Protection** 2,500 V_{RMS}
- **Opto-Isolator Response** 18 μ s
- **Input Resistance** 1 k Ω @ 0.5 W

Isolated Digital Output

- **Channels** AMAX-2754SY: 32 (4 ports)
AMAX-2756SY: 16 (2 ports)
- **Output Type** Sink (NPN) (open collector Darlington transistors)
- **Isolation Protection** 2,500 V_{RMS}
- **Output Voltage** 10 ~ 30 V_{DC}
- **Sink Current** 150 mA/ea. for multiple-channel usage,
total 1.1 A max. (1 port)

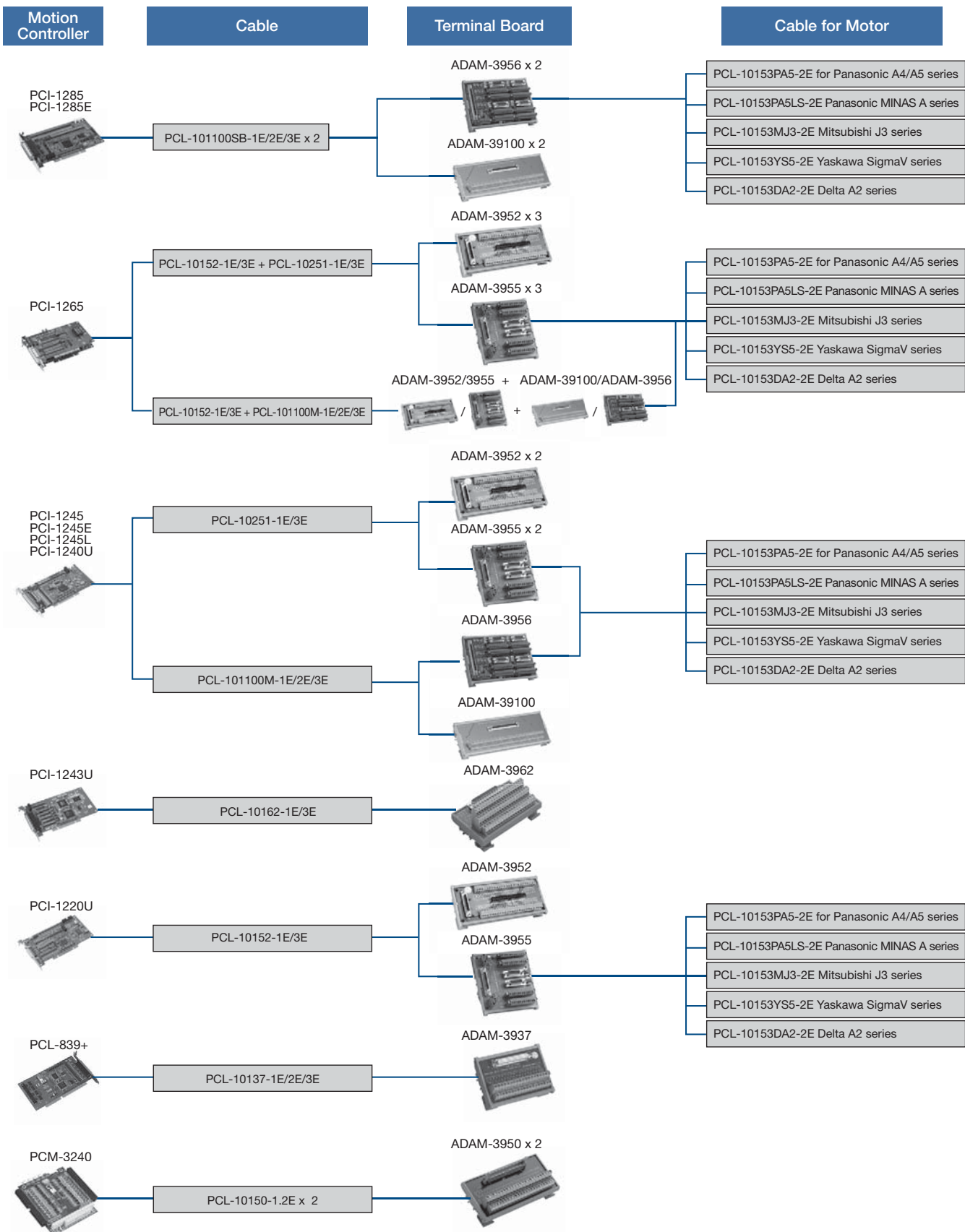
General

- **Bus Type** AMONet RS-485
- **Certification** CE, FCC Class A
- **Connectors** 2 x RJ45 and 2 x 40-pin wiring board
- **Dimensions (L x W x H)** 125 x 47.6 x 151 mm (4.9" x 1.8" x 5.9")
- **Power Consumption** AMAX-2752SY: 1.2 W typical, 5 W max.
AMAX-2754SY: 1.2 W typical, 5 W max.
AMAX-2756SY: 1.2 W typical, 5 W max.
- **Power Input** 24 V_{DC} within 200 mA ripple
- **Power Supply for DIO** 10 ~ 30 V_{DC} (Current < 2A)
- **Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)

Ordering Information

- **AMAX-2752SY-AE** 32-ch Isolated Digital Input AMONet Module
- **AMAX-2754SY-AE** 32-ch Isolated Digital Output AMONet Module
- **AMAX-2756SY-AE** 16/16-ch Isolated Digital I/O AMONet Module

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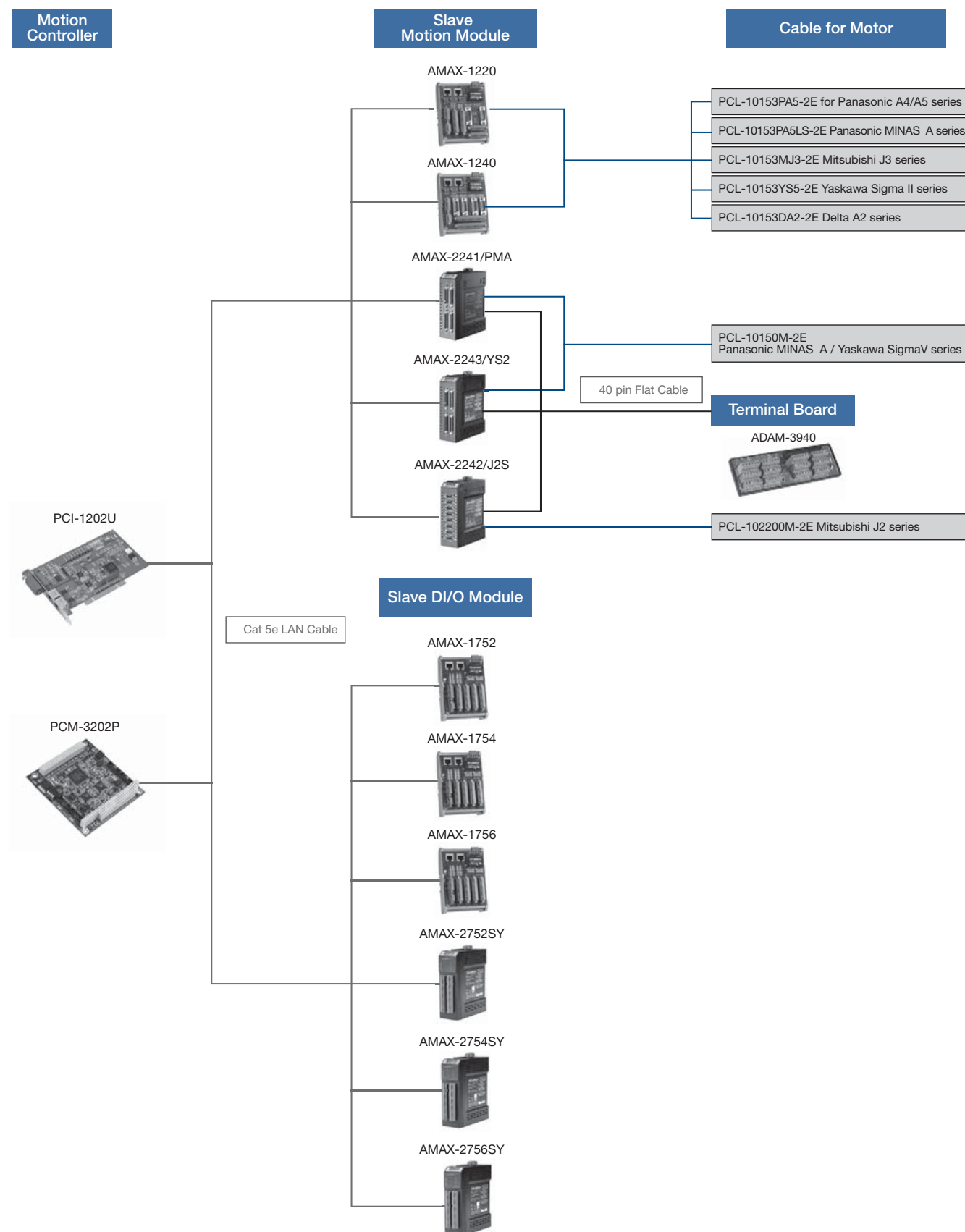
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Selection Guide



Accessories

DIN-rail Terminal Boards



ADAM-3940

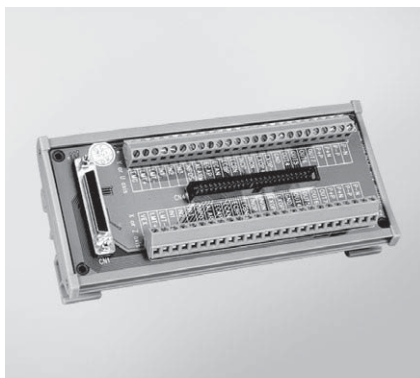
40-pin Wiring Board with LED

Features

- DIN-rail wiring board
- Dimensions (W x L x H): 160 x 50 x 43 mm (6.3" x 2" x 1.7")
- 40-pin box header connector
- LED indicators

To Be Used With

AMAX-2241, AMAX-2242, AMAX-2243



ADAM-3952

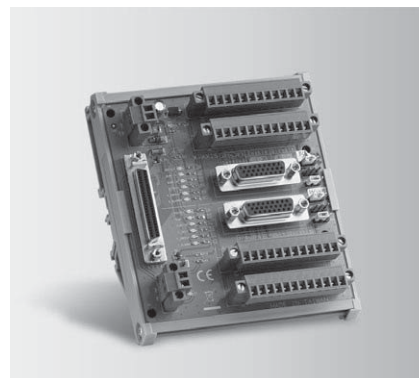
50-pin SCSI and IDC DIN-rail Wiring Board

Features

- DIN-rail wiring board
- Dimensions (W x L x H): 77.5 x 179.5 x 41.5 mm (3.1" x 7.1" x 1.6")
- 50-pin SCSI and IDC connectors

To Be Used With

PCI-1220U, PCI-1240U, PCI-1245, PCI-1245E, PCI-1245L, PCI-1265, PEC-3240



ADAM-3955

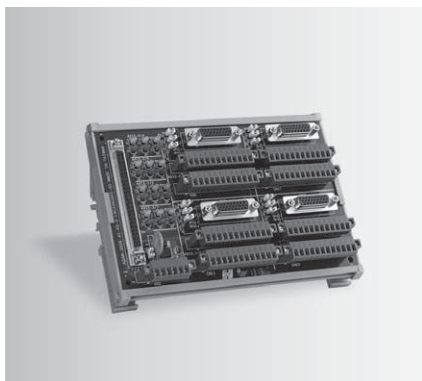
50-pin SCSI DIN-rail Motion Wiring Board

Features

- DIN-rail wiring board
- Dimensions (W x L x H): 103 x 120 x 45 mm (4.12" x 4.8" x 1.8")
- DB-26 and connector
- LED indicators

To Be Used With

PCI-1220U, PCI-1240U, PCI-1245, PCI-1245E, PCI-1245L, PCI-1265, PEC-3240



ADAM-3956

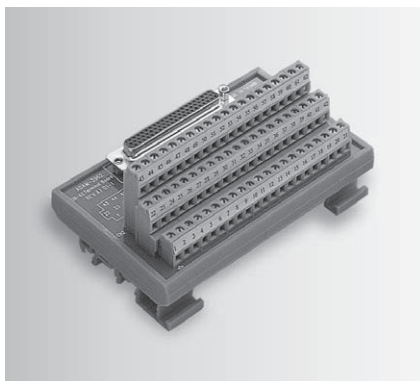
100-pin SCSI DIN-rail Motion Wiring Board

Features

- DIN-rail wiring board
- Dimensions (W x L x H): 122 x 171 x 45 mm (4.8" x 6.73" x 1.77")
- DB-26 and connector
- LED indicators

To Be Used With

PCI-1240U, PCI-1245, PCI-1245E, PCI-1245L, PCI-1265, PCI-1285, PCI-1285E



ADAM-3962

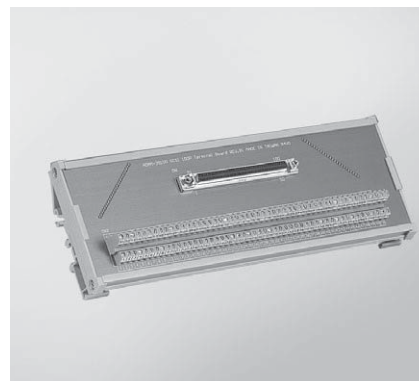
DB62 DIN-rail Wiring Board

Features

- Low cost universal DIN-rail mounting screw terminal module with DB62 female connector
- Screw-clamp terminal blocks allow easy and reliable connections
- Case dimensions (W x L x H): 77.5 x 124.5 x 63.5 mm (3.1" x 4.9" x 2.5")

To Be Used With

PCI-1243U



ADAM-39100

100-pin DIN-rail SCSI Wiring Board

Features

- Low cost universal DIN-rail mounting screw terminal module for industrial applications with 100-pin SCSI female connector
- Dimensions (W x L x H): 80 x 230 x 42 mm (3.14" x 9.05" x 1.65")

To Be Used With

PCI-1240U, PCI-1245, PCI-1245E, PCI-1245L, PCI-1265, PCI-1285, PCI-1285E

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Cable Accessory



PCL-101100M

100-pin SCSI Cable



PCL-10220M

20-pin SCSI Cable w/ 2 Connectors,
Ribbon Type



PCL-10162

DB-62 Cable



PCL-10150M

50-Pin SCSI Cable, Ribbon Type



PCL-10152

50-pin SCSI Cable



PCL-10251

100-pin to Two 50-pin SCSI Cable



PCL-10153PA5

50-pin Cable to Panasonic A4 and
A5 Servo



PCL-10153YS5

50-pin Cable to Yaskawa Sigma V Servo



PCL-10153MJ3

50-pin Cable to Mitsubishi J3 Servo



PCL-10153PA5LS

50-pin Cable to Panasonic MINAS A Servo



PCL-10153DA2

50-pin Cable to Delta A2 Servo



PCL-101100SB

Mini-SCSI 100-pin Cable